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PARESIS AND PARALYSIS OF THE EXTERNAL RECTUS MUSCLE OF THE EYE— REPORT OF TWO CASES.

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VERY little has been added to the subject of ocular paralysis since the publication of Mauthner's valuable treatise upon that pathologic condition. Clinical cases and a few minor suggestions as to classification are occasionally seen in the medical literature, but so far the monograph of that distinguished Viennese teacher is more universally accepted in its teaching than any other work on the same subject. Among the diseases of the eye some form of ocular paralysis or paresis is by no means uncommon, and of this pathologic condition the majority of writers[1] consider that of the external rectus muscle the most common. Two cases occurring in my private practice, one of paresis and the other of total paralysis of the external rectus muscle of one eye, presented several points of interest to which I wish to call attention in this article at the conclusion of a detailed account of the histories of the same.

Case I. Paresis of the left external rectus due to malarial infection.

F. S., male, 42 years of age, electrician, presented himself at my office with the following history: For the last three weeks there has been a feeling of giddiness and discomfort about the head whenever he turned his eyes to the left; has been a resident of this city for the last two or three years, before which time having lived in several of the Northern and Western cities, engaged in the electrical business; has enjoyed good health up to six months ago, but since then he has suffered occasionally with a general feeling of malaise and discomfort. During the last month he was

[1] Fuchs, Swanzy, de Schweinitz, Norris and Oliver, et al.

treated by his family physician for several attacks of "biliousness;" is continually tired; has never had any specific trouble, and on that point the history is very clear; he complains that for the last few weeks there has been a confusion of objects when looking up and to his left, at such a moment everything seems blurred; that sensation is not produced when looking to the right; it causes him so much inconvenience as to be scarcely able to work. The patient's complexion is very sallow, otherwise he looks strong and healthy. The urine was examined and showed nothing abnormal. Examination of the eyes: O. D. V. = $\frac{6}{6}$, no Hm.; O. S. V. = $\frac{6}{6}$, no Hm. Reads Jaeger No. 1 easily with either eye. Javal's was negative as also retinoscopy. By the ophthalmoscope the mediæ are seen to be perfectly clear; slight haze around the periphery of both discs; veinous pulsation; in the left eye there was an extra arterial branch running down from the central perforating trunk. Muscular—By simple ocular inspection both eyes appeared normal when fixed upon an object directly in front. When the object was moved to the right (patient's) there was still no deviation. When moved to the left (patient's) the left eye was tardy in its movement in that direction, and towards the extreme temporal periphery refused to move at all. When an object was held directly in front of both eyes at a distance one-half meter there was no diplopia, but as soon as it was carried toward the left, diplopia was immediately produced, the objects becoming further separated the further to the left the object was moved. With the red glass and candle flame at 6 meters there was found to be homonymous diplopia with a space of about 10 inches, increased, however, the further the head was turned to the right. The diplopia was corrected by a prism of 4° base out over either eye, but only when both eyes are parallelly directed in front of the body. Pupils normal in size and reacting to both light and accommodation. A diagnosis of paresis of the left external rectus muscle was made, the cause of which could not then be ascertained. There was no history of trauma, no signs of a syphilitic taint, no history of rheumatism, recent cold or anything with which the symptoms could be linked.

Treatment—The patient was placed upon sulph. strychnin $\frac{1}{60}$ gr. three times daily, with a gradual increase of the dose, using also the daily applications of electricity, alternating the constant with the induced current. This was continued for two weeks, when the tests showed not the slightest improvement, but in fact the images were a little further apart. The treatment was now changed by substituting the iodid of potassium for the strychnin, 20 gr. three times daily, with a continuance of the electrical applications. This was continued for two weeks, and still there was no appreciable sign of improvement. About this time the patient complained of having chills or chilly sensations every other night, and for the first time I noticed a distinct malarial cachexia. He was immediately placed upon active anti-malarial treatment, with the satisfaction of seeing a marked improvement within a few days. This treatment, with the addition later of tonics, was continued for some time, and on May 1, after an absence of about one week, the patient reported that he felt as well as ever and that there was absolutely no confused feeling as formerly when turning his eyes to the left. On testing the eyes the left was found to move as freely as the right in all directions. There was no diplopia discoverable at any angle,

either far, near or distant objects. Patient's general health much improved. In the light of the above I feel fully justified in attributing the cause of the paresis to malarial infection involving some portion of the sixth nerve.

Another case, while of not so much interest as that of the other in so far as the etiology is concerned, is, nevertheless, interesting in the result obtained and the method of treatment used.

Case II. C. T., 7 years of age, male, was brought to my office in January, 1891, by his father to see what was the cause of the double vision of which his boy complained. He gave the following history: The boy is perfectly strong and healthy. On the day before he attended school and remembered that in dropping something by his desk he stooped to pick it up when his left temple struck the edge of the desk. When he left school that afternoon for the first time he noticed that he saw double. The next day his father brought him to my office. Examination showed complete paralysis of the left external rectus muscle. There was no sign of a contusion about the orbit nor was there any ecchymosis discoverable about the eyeball itself. The lad was strong and healthy looking and showed in no wise any blood or lymphatic dyscrasia. There was no discoverable lesion in the bones about the orbit. Am unable to say whether it was the muscle or nerve proper which was affected, probably the former, due to a small hemorrhagic focus somewhere in its course, as the result obtained in the treatment in a great measure demonstrated.

Treatment—The patient was placed upon the sulph. strychnin $\frac{1}{60}$ gr. twice daily, gradually increasing the amount and at the same time alternating it with the iodid of potassium. In addition to the above there was the daily applications of electricity. Under this regime at the end of a month no appreciable change for the better being discernable, I commenced the gymnastic exercise of the paralyzed muscle. At first daily, after the application of electricity, the eye was cocainized and with a pair of fixation forceps the conjunctiva was seized over the affected muscle, the globe turned first to the right and then to the left, the patient being instructed at the same time to turn the other eye in the same direction, so that there might be associated movements of the two eyes. After three treatments the eye began to move a little to the left. Steady improvement now continued, so that frequency of the treatments being gradually lessened, about the 1st of April, three months afterwards, the patient's eyes had reached their normal equilibrium.

Cases of paralysis of the external muscles of the eye are by no means uncommon in ophthalmic practice, and the only reason for presenting the cases above is that in Case I the cause was referable to malarial intoxication and in Case II because of the excellent and speedy result obtained by the gymnastic method of treatment. Of the individual paralysis all writers agree that that of the external recti is the most common, as would naturally be expected from an anatomical point of view. In the literature at my command I have been unable to find any cases of paralysis of the

external ocular muscles where the cause was attributed to malarial infection. One writer[2], however, in a recent text-book, says, "paralysis of one or more of the external muscles of the eyes may also be due to malarial poisoning," not stating whether he has seen such cases. A very thoughtful resume as to the etiology and prognosis of paralysis of the ocular muscles is given by Liebreich[3]. In 25,000 patients treated between 1885 and 1890 there were 312 cases of paralysis of the muscles, not including uncomplicated paralysis of accommodation after diphtheria. Of these 312 cases 90, or 29%, were caused by tabes; 43, or 4%, by brain syphilis, and 114, or 36%, from unassigned causes. The remaining 65 cases, or 21%, were from a number of causes, as paralysis general, diphtheria, meningitis, influenza, rheumatism and other diseases. Thus in 64% the etiology was established, and in 36% it was not. The same author believes that every case of apparently idiopathic paralysis of the ocular muscles has its cause in a diseased condition of the body, which may not be detected for years subsequently. From this table of causes we see no mention of malarial infection, unless it be included under the head of general diseases.

That malaria is a cause, however, of many diseases of the eye has been known for a long time to ophthalmologists, and yearly the clinical cases of such are increasing.

Sulzer[4] finds the following categories of visual disturbances:

1. Chronic optic neuritis in grave cases associated with melanosis of the optic disc. 2. Diffuse infiltration of the vitreous body. 3. Numerous small hemorrhages in peripheral portions of the retina. 4. Sudden incurable amaurosis, probably in consequence of central hemorrhages or emboli.

De Schweinitz[5], from his own experience and from a careful study of the literature, concludes that malaria may originate:

1. An ophthalmia of the intermittent type which sometimes replaces the ordinary manifestations of the disease. 2. A certain form of keratitis. 3. Various functional ocular troubles—amblyopia, paresis of accommodation, changes in the field of vision, even hemianopsia and night blindness. 4. Gross changes in the interior of the eye—optic neuritis, optic atrophy, retinal hemorrhages and hemorrhages in the vitreous.

McNamara[6] has reported two cases of malarial neuritis and neuro-retinitis.

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[2] Adolph Alt, *Text-Book of Ophthalmology*, 1893.
[3] Liebreich, *Münich. Med. Wochenschrift*, June, 1890.
[4] *Klin. Monatsblaetter f. Aug.*, July, 1890.
[5] *Medical News*, June, 1890.
[6] *British Medical Journal*, November, 1890.

Bazot[7] reported two cases of double soft cataract and one of atrophy of the optic nerve following pernicious malaria in adolescents.

Risley[8] recorded a case of multiple retinal hemorrhages, recurring periodically, due to malarial poisoning.

Here, in the South, many diseases of the eye can be traced to malarial infection, and for the successful treatment of ocular troubles this fact must be borne in mind by Southern ophthalmologists. This statement applies more especially to those districts whose environments aid in the propagation of this miasm, or to such persons as have moved South from a cooler atmosphere. Here in our own city the altitude is so great and we are so entirely cut off from any low and marshy districts that true malaria is extremely rare, the majority of such cases being exotic in their origin. I am fully convinced, however, from close observation and clinical experience that in the South there are certain peculiar types of ocular troubles which are not found in the Northern clinics, and some day I hope to embody these observations into a more tangible form.

Case II is interesting both in its etiology and the success obtained by the gymnastic method of treatment. Traumatism is one of the most universal causes mentioned by writers upon this subject of isolated ocular paralysis.

Gutierez-Ponce[9] has reported a case of paralysis of the right externus noticed the day following a fall upon the occiput in a boy affected with chronic otitis of the right side. Iodid of potassium and stimulating friction having aggravated the condition, local treatment addressed to the ear was begun, with immediate improvement. Two four-minute seances with a galvanic current of eight couples from brow to closed lid completed the cure.

Feilchenfield[10] has reported another case of paralysis of the left abducens caused by a contusion of the occiput. He thought the probable cause was a circumscribed central hemorrhage. He cured his patient by the use of iodid of potassium and electricity.

The treatment of this pathologic condition as recommended in the various text-books on ophthalmology is almost universally the same. All authors agree that the internal administration of

[7] *Annales d'Oculistique*, November, 1891.
[8] *Theraputic Gazette*, February, 1892.
[9] *Recueil d'Ophthalmologie*, January, 1890.
[10] *Klin. Monattsb. f. Augenheilkunde*, May, 1890.

some form of mercury and the iodid of potassium are the *sine qua non* remedies for internal medication. They agree also as to the efficacy of electricity, the only differences existing being as to which form is the best to use.

Prof. Fuchs, of Vienna, advocates the use of the constant current and says that the induced can rarely be used with success.

Nettleship advises the use only of the Faradic current, while Adolph Alt recommends the application of the Galvanic current.

Noyes advises as preferable the use of the Faradic current, so that one readily sees what a diversity there exists as to which is the preferable form of electricity to use.

My own experience has been that the use of the constant current is much more beneficial at the beginning of the treatment because of its counter-irritant and tonic effect, while later, and especially after an improvement is noted, the induced current can be advantageously substituted. The gymnastic method, of which I have spoken, as first instituted by Prof. Michel in Germany, and brought prominently forward in this country by Dr. Bull, of New York, has, in my hands, proven of much value, and in my estimation should be given a much more prominent position as a method of treatment than it has heretofore received. While in all cases it has not proven to be successful yet in others it has acted most admirably. I find that it is more apt to be successful in those cases where electricity has failed to be of any benefit after a trial of at least two weeks. My method is as follows: After first cocainizing the eye the conjunctiva is seized with the fixation forceps over the affected muscle and the eye rotated in the directions normally made by that muscle when not paralyzed, instructing the patient to aid you by voluntarily turning the eyes in the direction of the forced movements. These forced movements are made about half a dozen times at each sitting, this latter occurring at first daily and then at longer intervals. As a final word, however, never forget to look thoroughly into the general condition of the patient.

GRADUATION OF THE ARC ON JAVAL'S OPHTHALMOMETER; AND GRADUATION ON A STRAIGHT ARM.

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IN the early part of this year the attention of the New York Ophthalmological Society was called to the question of *double* movable *mires* by A. E. Davis, M. D. This subject calls for some suggestions as to the regraduation of the arc; and the further question of an equivalent graduation on a straight arm invites the construction of such an arm. This paper proposes chiefly the discussion of the following propositions: (1.) the finer markings on the arc indicating the radius of corneal curvature as constituting an arithmetical series; (2.) the graduation of the arc for double movable *mires;* (3.) the graduation on a straight arm for a single movable *mire;* (4.) the graduation on a straight arm for double movable *mires.*

It may be worthy of note that the finer markings on the arc, when they are properly distanced, indicating the radius of curvature of the cornea, vary in the lengths of their spaces by a common difference which shows them to be in the order of an arithmetical series; and the results of this series agree substantially with those derived from the relation of object, image, distance and radius of curvature (O. I. D. R.). By calculations from the radius of curvature of the arc, Fig. 1, and from the logarithmic functions, the distances between the markings may be determined. The last space at 10 is found to be practically 1.5 mm; and the full length of this arc from 6 to 10 is about 122 mm. In an arithmetical series the solution of a problem is derived from the well-known algebraic formulæ, $l = a + (n - 1)\,d$; and $s = (a + l)\frac{n}{2}$, in which a represents the first term of the series, l the last term, d the common difference, n the number of terms and s the sum of all the terms. In this problem $s = (a + l)\frac{n}{2} = 122$, in which s and l are both unknown quantities. The question now becomes,

what number which when added to a and the sum multiplied by $\frac{n}{2}$ becomes = 122? For convenience x may represent this number, and remembering that n on the arc is at once 40, then $(a + x)\frac{n}{2} = 122$; $(1.5 + x)\,20 = 122$ or $x = 4.6$, *i. e.* $l = 4.6$ mm. From $d = \frac{l}{n-1}$ by substituting the values above, $d = .0795$ or practically .08 mm. Having determined the values of the different quantities it is an easy matter to find in this series any number or the sum of any numbers. Thus, $l = a + (n - 1)\,d = 2.2$ mm, length of space at 9.1 on the arc; $s = (a + l)\frac{n}{2} = 19$ mm, length of arc from 9 to 10; $l = a + (n - 1)\,d = 3.01$ mm, length of space at 8.1; $s = (a + l)\frac{n}{2} = 26.5$ mm, length of arc 8 to 9; $l = a + (n - 1)\,d = 3.8$ mm, length of space at 7.1; $s = (a + l)\frac{n}{2} = 34.4$ mm, length of arc 7 to 8; $l = a + (n-1)\,d = 4.6$ mm, length of space at 6.1; $s = (a + l)\frac{n}{2} = 42.6$ mm, length of arc 6 to 7; $s = (a + l)\frac{n}{2} = 122$ mm, distance from 6 to 10.

(FIG. 1)

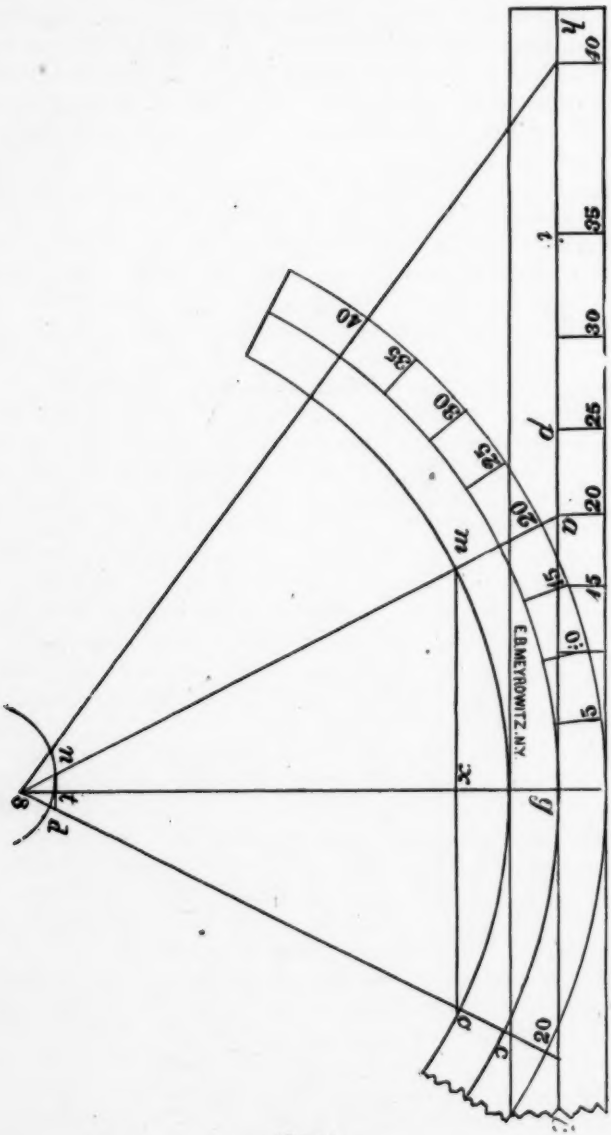
From slight inaccuracies in the measurement of this arc by the instrument maker the length of the entire arc may vary from one to two millimeters—a difference so slight as to practically amount to nothing. By the actual solution for R, and from the series above, it is evident that no two spaces on this arc in Fig. 1 ought to be equal: beginning at 10 and going along the scale to 6 the intervals gradually increase in length. In his excellent work, "Errors of Refraction," Dr. Valk, concerning this arc, says, "on the right hand side of the inner

circle we have a series of spaces from 6 to 10, each space being divided into 10 equal parts." Now this is plainly an error; for while, owing to imperfect mechanical construction, this may be true of parts of the arc, it ought not to be true of any part of it, as has already been shown, and will further appear in the course of this discussion.

If the size of an object, its distance from a convex mirror, and its image on the mirror are known, the radius of curvature of the mirror may be found: or if any three of these terms, O. I. D. R. be given the fourth may be easily obtained. Valk determines the value of R from $O : I :: D : \frac{R}{2}$ or $R' = \frac{2\,I\,D}{O}$. For strictly close work this equation might not be considered sufficient. If the value of R is derived from $O : I :: D + \frac{R}{2} : \frac{R}{2}$, or $R'' = \frac{2\,I\,D}{O-I}$, the results for the radius of curvature of the cornea will be found to be more nearly correct. Thus, if the radius of curvature of the *inner* rim of the brass arc be taken at 27 cm, then R', from the first equation, when the *mires* are at 20 diopters, is equal to 8.1 mm. Whereas by the second equation R" = 8.22 mm. In consequence of this formula for R, Valk's values for the markings of the radius of corneal curvature on the inner edge of the metal arc would be a little too small all the way from 6 to 10. R' differs from the value of R on the arc of Javal's ophthalmometer by .3 mm.; whereas R" will agree with it to within about .2 mm. from 6 to 10. This difference between R' and R" might be considered so slight as not worth disputing; for Helmholtz and others frequently use the formula R' for practical work.

It has been interesting to investigate the numbers on the arc as constituting an arithmetical series when only one of the *mires* is movable. In case both *mires* are movable, it requires a re-graduation of the arc for both the radius of curvature, and the spaces registering the number of diopters. For the number of diopters, it is only necessary to double the spaces on the arc, making each space one-half its present value, and changing the numbers 10, 15, 20, etc., to correspond accordingly.

But the new scale, for double movable *mires*, for the radius of curvature must be determined by a series of calculations, in which the formulæ derived from $O : I :: D + \frac{R}{2} : \frac{R}{2}$, play an important part. These computations are based on the following relations: In Fig. 2, sg. = 28.25 cm., which, it is evident by inspection, is the radius of curvature of the middle of the arc: the focal distance of the instrument is taken at 28.1 cm.—that being the focal distance the manufacturer aims at in the construc-



(FIG. 2.)

tion of the ophthalmometer. If the radius of curvature be taken at 28.25 cm. it places the *mires* in the middle of the arc.

In the following table column A exhibits the number of diopters on the arc for a single movable *mire;* B, the number of diopters when both *mires* are movable; R, the radius of corneal curvature expressed in millimeters:

A	B	R	A	B	R	A	B	R
16.59	13.19	10.4	18.92	17.94	9.1	22.03	24.06	7.8
16.75	13.51	10.3	19.13	18.26	9.0	22.31	24.62	7.7
16.91	13.83	10.2	19.34	18.68	8.9	22 60	25.20	7.6
17	14	10.1	19.55	19.11	8.8	22.89	25.78	7.5
17.25	14.50	10.0	19.78	19.74	8.7	23.20	26.41	7.4
17.41	14.82	9.9	20	20	8.6	23.52	27.03	7.3
17.59	15.18	9.8	20.24	20.48	8.5	23.84	27.68	7.2
17.77	15.54	9.7	20.47	20.95	8.4	24.17	28.34	7.1
17.95	15.91	9.6	20.72	21.44	8.3	24.51	29.02	7.0
18.14	16.28	9.5	20.97	21.94	8.2	24.86	29.73	6.9
18.33	16.64	9.4	21.22	22.44	8.1	25.22	30.45	6.8
18.51	17.03	9.3	21.48	22.97	8.0	25.60	31.19	6.7
18.62	17.24	9.2	21.75	23.50	7.9	25.98	31.96	6.6

Inspection of this table shows that if one of the *double* movable *mires* stands on the arc at 17 D. that it really registers 14 D.; and that 17 must be erased from the arc and 14 written in its place. So of all the other numbers in column A—they must give place on the arc to the numbers in column B. Thus the graduation of the arc as it now stands is easily converted into a re-graduation which will read the diopters for *double* movable *mires.* In column A, 17, 17.5, 18, 18.5, 19, 19.5, 20, 20.5, etc., are respectively equal to 14, 15, 16, 17, 18, 19, 20, 21, etc., in column B.

So much for the graduation of the arc for both single and double movable *mires.* Let it now be required to graduate the equivalent of this arc on a straight arm as shown in Fig. 2. Carl Weiland, M. D. (History and Principles of Keratometry: its value and limitations in the correction of Astigmatism, *Archiv. of Ophth.*, Jan., 1893), in discussing the distance from object to image, etc., says: "this [arc] ought to be a straight line, because on an arc the distance *d* of object and cornea is continually changing, just as the distance of a chord from the center of a circle is changing as long as the chord changes." But when this arc is projected on a straight line the objection which he urges against the arc, is found to obtain with equal force against the right line. By reference to Fig. 2, it will be seen that wherever the *mire m* is located it is always at the distance *m n* from the cornea *n t d*, and that *t x* is a variable, while *m n* is a fixed quantity. It will be noted that *s x* is the natural cosine of *m s x:* when the *mire m* moves on the arc toward o, then *t x* increases, whereas *m n* remains fixed. If the

mire m is made movable along a right line such as *g h*, then *g s* becomes a fixed quantity while the secants *h s*, *i s*, *a s*, etc., are constantly changing their value D.—*i. e.*, every time the *mire* is moved its distance from the cornea changes.

But in order to show the possibilities of this instrument, and to answer a demand for its solution, it can be demonstrated that a straight arm may be constructed in such a manner as to register all the elements ascertained by the arc. This construction will include the graduation of the arm for (1.) a single movable *mire;* and (2.) double movable *mires*. In Fig. 2, *s g* is = 28.25 cm.; the arm is 2.5 cm. in width; the *mires* move along the line *g p h*. It may be shown that the sin $m\ s\ x = \frac{m\ x}{m\ s}$, from which the angle *m s x* is found to be 21° 45′. Then tan. $a\ s\ g = \frac{a\ g}{s\ g} = \frac{a\ g}{28.25}$ or *a g* = log. 28.25 + log. tan. 21° 45′ = 112.7 mm.; so that when the *mires* are set at 20 D. on the arm which corresponds to 20 D. on the arc, the distance from *g* to *a* is 112.7 mm. By a series of calculations the tangents from 1 to 40 along this arm may be determined. The following table shows the lengths of the tangents calculated from *g* and beginning at 5 on the scale:

No. D.	Tang.	No. D.	Tang.	No. D.	Tang.	No. D.	Tang.
5	26.89	14	76.88	23	131.8	32	196.34
6	32.31	15	82.68	24	138.4	33	204.4
7	37.75	16	88.53	25	145.1	34	212.68
8	43.29	17	94.45	26	151.92	35	221.2
9	48.73	18	100.46	27	158.94	36	229.86
10	54.27	19	106.54	28	166.07	37	238.9
11	59 85	20	112.7	29	173.37	38	248.25
12	65.48	21	118.97	30	180.84	39	257.92
13	71.15	22	125.34	31	188.43	40	267.93

Thus when the *mire* is at 5 D. it is 26.9 mm. from *g;* when at 15 D. its distance from *g* is 82.68 mm.; when at 25 D. its tangent is 145 mm. By calculating the values of *a*, *l*, *d*, *n* in l = a + (n—1) d, *d* is found to be practically = .033 mm. or one-thirtieth of a millimeter; and therefore the tangents for the graduation of the straight arm, with a single movable *mire* are found to exist in the order of an arithmetical series as already shown in case of the markings on the brass arc for the value R. This common difference of .033 mm., by carrying the results to four decimal places is found to be substantially correct up to 25 D.

Since the markings have been established on this right line for the reading of the diopters it now becomes necessary to graduate the readings for R. Bearing in mind that D = 28.25 cm.;

I = 3mm.; with O. determined by the position of the *mire*, from O : I:: D + $\frac{R}{2}$: $\frac{R}{2}$ the values of R are tabulated below:

No. D.	R.	No. D.	R.
10	11.5	22.5	8
12.5	10.4	25	7.6
15	9.8	27.5	7.2
17.5	9.3	30	6.8
20	8.6	32.5	6.4
22	8.1	36.25	6

The last part of this question remains for solution—*i. e.*, the graduation of the arm for double movable *mires*. It becomes necessary to compute the values of the lengths of the spaces indicating the number of diopters, by calculating from the logarithmic functions of a double set of tangents. By the method already explained these values are found as in the following table beginning at 10:

D.	Tang.	R.	D.	Tang.	R.	D.	Tang.	R.
10	54.27	.....	17	94.45	9.2	24	138.4	7.8
10.5	57.05	.....	17.5	97.44	.....	24.5	141.63	....
11	59.85	.....	18	100.46	9.5	25	145.1	7.6
11.5	62.66	.....	18.5	103.50	.....	25.5	148.51	.....
12	65.48	10.7	19	106.54	8.8	26	151.92	7.46
12.5	68.31	....	19.5	109.60	.....	26.5	155.43	.....
13	75.15	10.4	20	112.70	8.6	27	158.94	7.3
13.5	74.01	.....	20.5	115.82	....	27.5	162.48	.....
14	76.88	10.1	21	118.97	8.3	28	166.07	7.1
14.5	79.77	.....	21.5	122.14	.....	28.5	169.7	.....
15	82.68	9.8	22	125.34	8.1	29	173.37	7.
15.5	85.58	.....	22.5	128.56	.....	29.5	177.07	.....
16	88.53	9.6	23	131.8	7.99	30	180.84	6.8
16.5	91.48	.....	23.5	135.09	.....	32	196.34	6.6

By the methods previously adopted R may be determined for any number of diopters; its values have been placed in the above table, for the graduation of the straight arm for double movable *mires*. So it is seen that the distance on this arm from g. to 10 D. = 54.27 mm.; to 15 D. = 82.6, and so on to any number along the scale. In the case of *double* movable *mires* neither the arc nor the arm needs to be graduated beyond 30. Of course it is understood that in Fig. 2 that part of the diagram lying in the direction of *g c* and *g k* is intended to be the duplicate of the part on the side *g a*. It is plain to observe that the spaces on the straight arm are unequal in length: thus the tangent in the last table for 20 D. is given 112.7 mm.; 21 D. is given 118.9; their difference is 6.2; the difference between 21 D. and 22 D. is 6.4;

the difference between 22 D. and 23 D. is 6.5. These differences between the tangents give the length of the spaces between the diopters; the length of the space from D. 20 to D. 21 is 6.2; 21 D. to 22 D. is 6.4; 22 D to 23 D. is 6.5 mm.

Dr. A. E. Davis who has a reprint[1] on the use of Javal's Ophthalmometer, and who has given considerable atttention to the question of double movable *mires*, is of the opinion that the accuracy of the instrument is increased by having both *mires* movable. He discusses this subject in advance sheets of a paper on the question; and thinks the efficiency of the ophthalmometer will be increased by using double movable *mires*, especially in those cases where the angle *alpha* may be large.

Before the present improved Javal's ophthalmometer, Le Roy and Dubois devised one with a short straight bar for the *mires*. It may be urged against the graduation on a right line for the dioptric measurement, that as the *mires* separate they increase their distance from the eye; and, therefore, their images on the cornea grow smaller. This view is correct; and in high degrees of astigmatism the instrument, theoretically, would register too much. Practically, perhaps, the error would be too small for the instrument to appreciate. This article has not claimed any advantages of a straight arm over the arc on Javal's ophthalmometer; it shows the possibilities of the construction of an arm correctly graduated, without altering any other elements of the instrument.

It will be remembered that Fig. 2 is constructed so as to give the radius of curvature of the middle of the metal arc 28.25 cm. instead of 27 cm. for the inner edge of the arc. This construction makes no difference in the registering of the number of diopters of astigmatism—*i. e.*, in registering the size of the corneal image: it only slightly changes the markings for R; and when close results are derived for the value of R, as in R″, they agree more nearly with the graduation of the present arc than if they were calculated from 27 cm. Judging from the literature on this question, it is generally understood that Javal determined the value of R on the basis that the inner edge of the arc is 27 cm.; and that he considered D. = 27 cm. If this be true then neither R′ nor R″ as given previously will agree precisely with the graduation of the present arc—their values being a little too small. But certainly Javal must have used either R′ or R″; therefore it can not be

[1] Javal's Ophthalmometer and Atropin in determining errors of refraction. (*New York Med. Jour.*, Sept. 10, '92, and Oct. 8, '92.)

true that D. = 27 cm. The tables herein compiled derive R″ when D. = 28.25 cm., and thus it is found that R″ agrees with the arc as now graduated to within about $\frac{1}{10}$ mm. through all the 40 intervals from 6 to 10. R″ is used in the foregoing tables because its results are more nearly correct than R′.

Now it becomes interesting to note that if D. = 28.25 cm., and the radius of corneal curvature is determined from $R' = \frac{21D}{6}$, then the values of R′ agree exactly with the graduation of the arc, now in use.

If any author has considered the actual solution of the four propositions comprehended in the scope of this paper, the matter has not come to the writer's notice.

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VALUE OF THE OPHTHALMOMETER IN PRACTICAL REFRACTION WORK.[1]

By Edward Jackson, A. M., M. D.

PROFESSOR OF DISEASES OF THE EYE IN THE PHILADELPHIA POLYCLINIC; SURGEON TO WILLS' EYE HOSPITAL.

IN opening a discussion of this subject, as I seek to do by briefly presenting my own experience and some conclusions drawn from it, it may be premised that the practical value of such an instrument depends: first upon what it does, and only secondarily upon the ease with which it can be used and the saving of time that it can effect.

The ophthalmometer measures the corneal astigmatism and, speaking as I now do of the instrument of Javal used for practical diagnosis, this is all that it does. It measures this astigmatism to an accuracy dependent somewhat on the acuteness of vision and accuracy of observation of the user, but mainly upon the exactness of its adjustment and the excellence of its illumination.

In this matter of illumination, it should be remembered that we are seeking to study the reflection from the surface of a transparent medium, and the distinctness of this reflection depends both on the illumination of the object reflected from the surface and on the illumination of the background seen through that surface. The better the illumination of the mires, the better the reflection from the cornea; the feebler the illumination of the iris, the less is the perception of the reflected image interfered with. On this account, it is almost as important to shut off light from the eye under observation, as to illuminate the instrument; and, the best measurements are made with the pupil sufficiently dilated to give a black background. The best illumination I have ever seen was obtained by diffused daylight, the ophthalmometer being placed so as to receive the light from a large window.

With good illumination, a person with accurate vision can measure corneal astigmatism to within 0.25 D., or even to within one-eighth of 1 D. But in practical work on refraction, the corneal astigmatism is of no interest whatever except in so far as it is an index of the total astigmatism.

[1] Read before the American Ophthalmological Society.

How far does the corneal correspond to the total astigmatism? In five hundred (500) eyes measured with the ophthalmometer, and subsequently studied by other methods, with the aid in all cases under fifty years of age of full paralysis of accommodation, I find the following results:

In 6% of all cases, the corneal astigmatism corresponded exactly with the total astigmatism, both as to amount and as to the directions of the principal meridians. In 16.6% additional, making 22.6%, the amount of corneal astigmatism exactly equaled the total astigmatism. The difference between the two was 0.25 D. in 21.6%; it was 0.50 D. in 20%; 0.75 D. in 11.8%; 1 D. in 4.4%; 1.25 D. in 2.6%, and from 1.50 to 3.50 D. in 2%. Of the 77.4% in which the corneal astigmatism did not correspond with the total, the former was in excess in 62% and the latter in 15.4. In over half of these, 8%, the astigmatism was with the rule, and and in 7.4% it was against the rule.

As to the correspondence of the meridians, taking all the cases of astigmatism, it was found that they corresponded exactly in 31% and if to this be added 3.6% in which the direction of the total astigmatism was exactly the reverse of that of the corneal astigmatism, we have 34.6% of cases in which the instrument indicated exactly the direction of the principal meridians. In 4% there was no corneal astigmatism, but some total astigmatism; in 11% there was corneal astigmatism which was neutralized (presumably by astigmatism of the lens), and in 3% there was neither corneal nor lenticular astigmatism and if these be added to the cases in which the meridians were correctly indicated, we find 52.6% of cases in which the indications of the ophthalmometer were not misleading as to the direction of the principal meridians of astigmatism.

In 17% the difference between the meridians was only 5°; in 9.6% it was 10°; in 5.4%, 15°; in 8% from 20° to 45°, and in the remaining 7.2% the true meridians were from 5° to 40° from exact reversal.

With reference to the direction of the astigmatism, however, when this is less than 0.50 D., the determination with the ophthalmometer is apt to be uncertain. The mires run up or recede—their axes correspond or break—from point to point as they are swept around the circle. Taking only eyes in which the corneal and total astigmatism each amounted to 0.50 D. or over, numbering 256, I find that the meridians of corneal and total astigmatism correspond exactly, or they were exactly reversed in 44%;

they differed by 5°, or by 5° from exact reversal, in 22.4%; by 10° in 14.2%; by 15° in 8.4%, and from 20° to 45° in 11%. That is, in 89% the ophthalmometer showed the direction of the principal meridian to within 15°, while in 11% it did not come nearer than 20° to 45° to the meridians of total astigmatism.

A careful study of my tabulated cases shows that it is quite impossible to adopt any rule of adding to, or subtracting from the corneal astigmatism, either a fixed quantity or a fixed proportion, to obtain the amount of the total astigmatism with greater probability than by assuming an exact correspondence Thus there was an exact correspondence in 22.6%. If a 0.25 D. was subtracted from the corneal astigmatism, it would give the total astigmatism in 21.2%. If 0.50 D. were subtracted from the corneal astigmatism it would give the total astigmatism in 20%. If 0.75 D. were subtracted from the corneal astigmatism, it would give the total astigmatism in 11.8%. If the total astigmatism were taken as three-quarters of the corneal, it would be correct in 15%. If a subtraction of 0.50 D. were made in cases of astigmatism with the rule, and the same amount added in astigmatism against the rule, as has been proposed by some, the total astigmatism would have been obtained in less than 21%.

It appears, therefore, that while the corneal astigmatism approximates the total in amount and in the direction of its principal meridians, in the majority of cases the approximation is not so close as may be rightfully demanded of the ophthalmic surgeon in his correction of ametropia; and that in exceptional cases, which are, however, by no means rare, the difference between the corneal and total astigmatism is so great that the former can hardly be regarded as in any proper sense a guide to the latter.

In practical refraction work, therefore, the ophthalmometer is to be considered as a means for approximating the probable amount and meridians of astigmatism, As such a means of approximation it is for certainty to be ranked as superior to direct ophthalmoscopy; but greatly inferior to skiascopy among objective methods, and distinctly inferior to the subjective tests with the distorted point of light, the slit, or the parallel lines seen through spherical lenses.

What it does, then, places it clearly among the approximate tests. But among such tests the definiteness with which it indicates what it does indicate, the fact that its indications are entirely objective, and the rapidity with which they may be obtained, all give it high rank in this class of approximate tests. It is, too, an easy method of examination to master; requiring small experience

and simply the same power of observation as is needed for the accurate use of a thermometer or a tape measure. Indeed, so much of its value depends on the care of its original adjustment, and its illumination; and so little on the skill or patience of the observer, that it is liable at some time to become popular among counter-prescribing opticians.

It will be understood that in the foregoing remarks, I referred simply to its value as a practical means of measuring ametropia for the adjustment of lenses, Of the scientific value of the simple determination of the corneal astigmatism, and of its practical value in the determination of astigmatism in the aphakic eye, either of which amply justify its routine use, I have purposely said nothing.

TWO ATYPICAL CASES OF CONGENITAL ANOMALIES OF THE CORNEA, WITH THREE ILLUSTRATIONS.

By H. V. Würdemann, M. D.
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THE daily routine of medical practice is at times enlivened by the occurrence of rare cases or exceptional complications, which either teach us therapeutic rules or are of interest on account of their infrequency or morphologic value. Some of these are worthy of record, and perhaps if the nature of such were more frequently recognized their existence would not be deemed so rare. Although the therapeutics of congenital malformations is usually unpromising, the study of these strange freaks of nature is of the greatest interest.

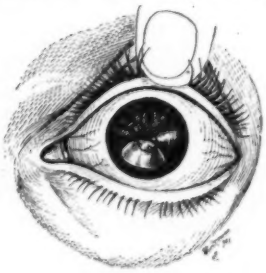
Case I. Congenital staphlyoma or coloboma of the cornea with paralysis of the right external rectus, nystagmus and microphthalmos.

Mrs. N. M.; Irish; 50 years of age; consulted me with trachoma and trichiasis with which she had suffered for several years. V.: R. E., = fingers at 1 M,; L. E., = fingers at 3 M.; congenital nystagmus and paralysis of right external rectus. Corneæ small; irides normal; refraction, after she had obtained some relief from conjunctival affection and after the offending eyelashes had been removed by electrolysis, was under mydriatic V.: R. + 2.75, fingers 4 M.; L. + 2.75= $\frac{6}{30}$. There was a most peculiar defect in lower portion of the left cornea, the like of which I had never seen nor read. A second smaller segment was implanted on the cornea like a little oval watch crystal, 5 mm. high, 7 mm. in width, perfectly clear and of higher refraction so that the subjacent portion of the iris appeared magnified (See Figs. 1—2.)

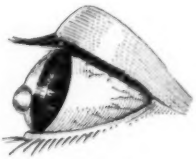
This was said to have existed as it was since birth. Judging from the absolute transparency of the engrafted tissue and its

apparent similarity to the true corneal substance, we would suppose that its formation was due to an arrest of development in the fetal cleft rather than to a giving away of a reparative prenatal corneal cicatrix. Against this view is, however, arrayed the statement of Pincus that congenital corneal staphylomata are due to inflammation in the second half of fetal life. To my mind this structure arose from inhibition of growth during development, forming a coloboma of the cornea which in later weeks of uterine life became filled with clear corneal tissue. This view is borne out by the existence of congenital paralysis or absence of right external rectus and nystagmus, and above all by the microphthalmos.

Now ensues an interesting chapter in the history of this case and from my own standpoint, a most disappointing incident. For, on account of the approaching meeting of the American Medical Association in our city, I had resolved to exhibit this case to some



(FIG. 1)



(FIG. 2)

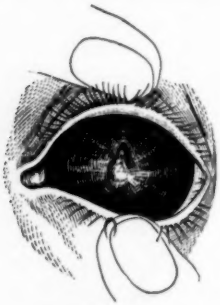
Congenital Staphyloma of Cornea.

of my confreres in order to obtain, if possible, further light upon its origin. A couple of months before this event the patient appeared in great pain, stating that her child had cut the eye while playing with a comb about her mother's face. On examination I found the "beautiful specimen" irretreviably ruined by the accident. I was obliged to trim the edges of the cut cornea, putting on a compress antiseptic bandage, had little satisfaction in noting the healing of the wound in ten days. The traumatism left a leucomatous patch on a level with the corneal surface. The patient was, on the whole, a gainer by the accident, for the cicatricial contraction doubled the visual acuity of this eye so that V.: R. + 2.75, $= \frac{6}{xxx}$, L. + 2.75 ⊃ + 1.00, 150°, $= \frac{6}{xxx}$. It is marvelous how long she had carried this protuberance without accident and not a little queer that the traumatism should have happened when the presence of the object was about to prove of some service, if not to the patient, at least to the physician.

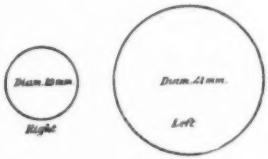
Case II. Congenital bucephthalmos.

M. L., 6 weeks of age, Polish parentage; brought to me presenting an opposite type of congenital corneal defect to the foregoing case. When the lids were closed nothing could be observed about either eye, but on opening them the difference was startling. (See Figs. 3—4.)

The right seemed normal, although from comparison with other infants I was convinced that it was smaller than it should be. Movements of both normal. The left seemed all cornea and iris, but on manipulation a narrow rim of sclera could be observed at the external canthus. This cornea was 21 mm. in width while



(FIG. 3.)
Congenital Bucephthalmos.



(FIG. 4.)
Comparative sizes of Corneæ.

that of the right was 10 mm. The anterior hemisphere was composed of clear corneal tissue. The globe itself was flattened. The tension was even less than normal, so the existing causes (believed in such cases to be glaucomatous) had evidently subsided. There were, however, evidences of the previous existing intra-uterine inflammatory process in opacity of the lens and occlusion of the pupil. The anterior chamber was shallow; the red color of the fundus was faintly discernable by the ophthalmoscope. The case was seen one week later when appearances were apparently the same, but since has been lost to view.

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ARE GUN-CAP WOUNDS OF THE EYE WITHOUT DANGER?

By C. M. Hobby, M. D.,
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THE advance reports of the Eighth International Ophthalmological Congress, as published in the *Philadelphia Polyclinic*, besides other surprises, seem to present to the profession at large in the following extract a very dangerous proposition, "Leber (Heidelberg) read a paper on this subject, (Injuries from copper). The highly poisonous nature of this chemical substance is very injurious. Extraction of the body is difficult in most cases. When it is removed, the irritation soon subsides. These injuries are mostly due to percussion caps. The explosion and flame destroy any germs which may be adherent. Hence it is proper to attempt to save eyes so injured, even if there be pus in the vitreous, provided this can be attributed to the chemical and not to infection. *There is, moreover, in such cases (of copper poisoning) no danger of sympathetic inflammation.*" The portion of the extract italicised appears to be diametricially opposed to the experience of ophthalmic surgeons in this country.

In a paper read before the ophthalmological section of American Medical Association, June, 1887, published in the *Journal* of the association, October 15, 1887, the writer gave what has appeared to be the generally accepted American opinion in regard to innocuousness, as follows:

"We must recognize that sympathetic ophthalmia does not, of necessity, follow any particular kind of injury; that a man may go through life with an eye rendered blind by invasion of a foreign body, or that the ciliary region may be punctured by an osage thorn, and an atrophic globe ensue, without the other eye suffering in the least; but we know that in 100 of such cases, uninterfered with, many would be found blind at the end of twelve years. On the other hand punctures of the cornea, incarcerations of the iris in the cornea, traumatisms of the lens, or wounds of the sclera near the equator, while always carrying an element of danger with them, are not followed in any great proportion of cases by lesion of the other eye. Therefore, I believe the first indication for preventive enucleation is the presence of an inaccessible foreign

body within the eye, or severe injury of the ciliary region of the globe, and that this indication exists, even if there be retained, to use Mauthner's language, '*a certain amount of vision*,' and with me the '*certain amount*' would be *considerable*, if the patient had a piece of gun-cap within his eye."

It must be borne in mind, that in a country where there is no restriction placed upon owning and using fire-arms, and where nearly every boy, away from large cities, begins to handle guns as early as 14 years of age, the opportunity for gun-cap accidents is increased many times beyond that existing upon the continent of Europe. That retained gun-caps do produce sympathetic ophthalmia with great frequency can be verified in any of the institutions for the blind. Before the hypothesis of infective origin of sympathetic ophthalmia was advanced, it was generally believed, in this country, that wounds from gun-caps were *more* prone to be followed by this dreaded result than any other traumatism. My belief was, and is, that the part injured, not the material injuring, is the determinant of sympathetic ophthalmia. As preventive eneucleation has been practiced in all cases under my care, when the ciliary region was involved in a wound made by a perforating gun-cap, I have not been able to watch many cases through the development of this condition. A few cases, however, have come under observation where fragments of gun-caps have been retained within the eye, and these I append to show that copper is as dangerous as steel from a clinical point of view. These cases are all the private cases of gun-cap wounds, where preventive eneucleation was not practiced, excluding thus a number of cases where the so-called sympathetic irritation foreboded the approach of trouble. In addition to these cases, I have seen not less than twenty in the College for the Blind, of Iowa, in whom the blindness of the second eye followed, and was probably due to gun-cap wound, usually with retained fragment.

Case I. Piece of gun-cap retained eleven years without sympathetic ophthalmia.

T. M., 22 years of age, eleven years previously received a fragment of a gun cap in the R. E., striking the globe near the center of the cornea. Lens absorbed, capsule attached to iris, iris discolored, no perception of light. L. E. normal.

Case II. Sympathetic ophthalmia twenty years after gun-cap wound.

W. P. W., 43 years of age, twenty years ago right eye was injured by a piece of gun cap which it was supposed was removed a month later, but by that time vision was entirely gone in the right eye. No further trouble until three months ago, when the left eye began to fail. When examined there was found occlusion of the pupil, complete circular synechia, vision $= \frac{14}{128}$, a month later there was bare perception of light.

Case III. Sympathetic ophthalmia one month after gun-cap accident.

W. D., 12 years of age, struck in right eye with a fragment of gun cap four months ago, the fragment passed through the ciliary region into the globe, an unsuccessful attempt to remove the metal was made at the time. One month after injury, sympathetic ophthalmia developed in the left eye, which at the time of examination was already atrophic.

Case IV. Fragment of gun-cap retained four years without injury.

E. M., 17 years of age, struck in left eye four years ago with a fragment of a gun-cap which passed through the cornea, iris and lens, vision lost at once. Right eye still retains normal vision.

Case V. Injury by gun-cap followed by disease of the other eye, of doubtful relationship.

J. M. B., 37 years of age, struck in the right eye with a fragment of a gun-cap, twenty-eight years ago, immediate loss of sight of the injured eye. The left eye gives with — 12 D. S. $= \frac{7}{12}$. The vitreous is filled with floating bodies, and masses of choroidal pigmentation can be seen with difficulty.

I have notes of several cases where steel has been retained ten years or more, without affecting the other eye; one in which lead, a No. 6 shot, was retained sixteen years; and a case now under observation in which a 22-caliber bullet has been retained four years without injury to the other eye. On the other hand, sympathetic ophthalmia has occurred several times in my experience after a foreign body has remained in quiet more than twenty years. The opinion of the writer, based upon over five hundred cases of traumatism involving penetration of the globe by accidental causes, is that injury of the ciliary region of the globe is the clinical factor of greatest importance in predetermining sympathetic ophthalmia; unless the ciliary region be injured, a foreign body may remain innocuous in the eye until, perhaps after many years, the slow processes of degenerative change, especially those resulting in the formation of bone, reach the region of danger; and when this occurs even after fifty years, the other eye is at once in jeopardy. I have never regretted advising the prompt removal of a hopelessly injured eye from whatever cause; but scarcely a month passes but some patient appears who must regret through life vainly, that such advice had not been given him earlier.

"The professional errors of one generation become the popular errors of the next;" the random dicta of celebrated specialists are prone to become the law of general practitioners. Physicians reading the ophthalmologic abstracts of the journals, still inject discomfort into the minds of those who have had a proper eneucleation, because of the wide-spread belief amongst them of the superior advantages of excentration, and it is to be feared that the foregoing dogma, that eyes containing fragments of gun-caps are in "no danger of sympathetic inflammation," may serve as an excuse for delay and thus doom many to hopeless blindness.

RESULTS OF SUBCONJUNCTIVAL INJECTIONS IN SOME EYE DISEASES.

By Chas. H. Baker, M. D.,
of Bay City, Mich.

THERE is no claim for priority, in the use of subconjunctival injections, in this report; but believing that few ophthalmologists are personally familiar with the advantages which it offers, the author has collected a few cases to report that others may be encouraged to try the same plans.

Every ophthalmologist knows how protracted are cases of interstitial keratitis, under the older methods of treatment, and results warrant the statement that no other method will give so prompt healing and return of sight as does this.

Case I. Cora G., 12 years of age, was under treatment three or four months with hot fomentations, iodids, mercurials, locally and internally, tonics, and, what had previously given me excellent results, pills of arsenic iodid. Present condition: intense photophobia, with reflex cough brought on by exposing eyes to light, blepharospasm, cornea milky, conjunctiva much congested and vision equals light only.

After thorough cocainizing, one minim of a solution of mercuric chlorid, one part in 30,000, was injected under the conjunctiva of the right eye, below the cornea. In two days the redness and photophobia of this eye were much lessened, and, on the fourth day, a second injection was used in each eye. On the seventh day she could bear to have eyes opened toward the windows, and on the fourteenth, could open them herself. Injections were repeated once in three to seven days, and a complete recovery was had after seven injections. The internal administration of remedies was discontinued after the first injection.

Case II. Master B., referred by the family physician, with commencing interstitial keratitis of one eye, which had lasted about ten days. A number of minute grey spots were scattered over the cornea with haziness between. One injection of the above solution was given, together with a prescription for potass. iodid and pills of mercury protoiodid. The patient did not return, but I was informed by his physician, that he soon recoverd and resumed his work.

Case III. B., girl, 12 years of age, one year ago was under treatment, by me, two months, for interstitial keratitis which responded very slowly to specific treatment, rest and tonics. She returned after six months with relapse in both eyes. This patient received biweekly injections of a minim in each eye, for four weeks, when treatment was stopped with vision $\frac{20}{30}$ after correction of her mixed astigmatism. No other treatment was given with the injections.

Case IV. Mr. C., interstitial keratitis from acquired syphilis, confined to one eye, has lasted three or four months. During two weeks received injections once in two and three days, according to the amount of reaction. There was rapid improvement in the amount of irritation in the eye, although the haziness of the cornea was not much lessened. The patient left town, and I have since heard his eyesight is much improved.

The second class of cases which was improved by this treatment was those suffering from choroiditis, and the results were equally good in those of recent and also long standing.

Case I. Mrs. B., 37 years of age, vision good until thirteen weeks ago, when, being pregnant, she had anasarca, a miscarriage, and rapid loss of vision. Ophthalmoscope showed choroiditis, marked at the macula, which resembled a red fern leaf, and a few scattered spots of inflammation outside the macula. There was no exudation, such as would be produced in retinitis albuminurica. Her family physician had given her potass. iodid and strychnin. Vision was $\frac{20}{70}$ — in each eye. She received four injections at intervals during two months. Vision improved from $\frac{20}{70}$ — to $\frac{20}{40}$ — after the first injection. At the time of her last visit V. = $\frac{20}{30}$ +, seven months subsequent to the first visit. This patient lived at a considerable distance from the city and could receive injections at infrequent intervals. She was given mercurial inunctions for a short time, but soon discontinued them. She also had potass. iodid for about four months, so that not all her improvement could justly be credited to the injections.

Case II. Mr. F., 35 years of age, at his first visit V. = fingers at one foot, to outer side of field, elsewhere *nil*. He received one injection and in two days vision equaled fingers at twenty inches over entire field except small central area. Choroid at macula very red. Has a few atrophic spots about macula of left eye from an attack a year ago. O. S., V. = $\frac{20}{30}$ —. Eight days after the second injection V. = $\frac{20}{100}$. Macula much improved in appearance. Thirteen days later V. = $\frac{20}{50}$. He received no other treatment, yet in twenty-three days vision increased from practically nothing to $\frac{20}{50}$. The patient now discontinued his visits.

Case III. L. G., 36 years of age, has been under treatment the past three years for neuro-retinitis and choroiditis. Treatment has consisted of mercury internally and hypodermatically and by inunction, also potass. iodid in 20 to 40 gr. doses three times daily, and his vision has fluctuated from light perception to $\frac{1}{70}$. Under a course of hypodermics in December, 1893, O. S., V. = $\frac{20}{40}$ and O. D., V. = $\frac{20}{30}$ —.

On May 21, 1894, vision was reduced to $\frac{20}{200}$ and $\frac{20}{60}$ — respectively. June 3, after four injections, O. S., V. = $\frac{20}{70}$ and O. D., V. = $\frac{20}{40}$, which was better vision than he ever obtained by any other plan of treatment.

Neuro-retinitis uncomplicated by choroiditis I have found to yield well to this treatment.

Case I. Mr. H., 41 years of age, neuro-retinitis, probably syphilitic and alcoholic. O. S., V. = $\frac{15}{20}$, O. D., V = $\frac{15}{40}$. Under 30 gr. doses of potass. iodid, vision increased in thirty days to $\frac{20}{40}$ and $\frac{20}{30}$ respectively. Subconjunctival injections were now begun and vision rapidly rose to $\frac{20}{20}$. This man attributed his loss of sight to the medicine received at one of the "cures" for inebriates.

These few cases serve as an index to the kind which are most amenable to this treatment. As is to be expected, the syphilitic cases are most rapidly benefited, and as it has been shown by Phlüger that after such injections the mercuric chlorid may be demonstrated in the cornea, aqueous, super-choroidal space, vitreous and superficial layers of the lens; the reason is plain. Instead of scattering your medication over the whole body, most of which may be free of syphilitic lesions, the remedy is concentrated at the point where needed. A little mathematical calculation will demonstrate the greater quantity to be introduced into the eye by this kind and size injections, than by hypodermics in other regions, and any one who will try will easily be satisfied that the irritation is nothing compared with the larger doses, $\frac{1}{1000}$, which have been recommended, and the results equally good if not better. In one of these cases one minim of a $\frac{1}{1000}$ solution was injected, with the result of almost driving the patient away by causing severe reaction with positive deterioration of vision, which rapidly gained again when the mild injections were resumed.

I have not tried this treatment in septic cases as yet but shall do so at the first opportunity.

The injection should be made after thorough cocainizing at a considerable distance from the cornea, the patient sharply rolling the eye up and in or out as required. Puncture of vessels is also to be guarded against, the resulting discoloration being very objectionable in appearance.

An objection to the validity of these cases may be made; that the treatment in most of them was not unmixed and therefore not all the results could be attributed to the injections; but among private patients it is unsafe to attempt untried methods, to the neglect of those that have proved valuable, lest the failure of the first plan may lose the case. In any future case, of the kinds here given, however, I would not hesitate to try this plan, to the exclusion of any other.

THE TOXIC AMBLYOPIAS; THEIR SYMPTOMS, VARIETIES, PATHOLOGY AND TREATMENT.

By Casey A. Wood, C. M., M. D.,
of Chicago.

[*Continued from Vol. III, page 287.*]

BELLADONNA AND ITS ALKALOIDS. In addition to the symptoms detailed on page 176 there are several instances recorded where *glaucoma* has resulted from the external application of mydriatics. In two instances, also, optic nerve atrophy with contractions of the visual field are said to have been caused by their use, but these cases are not well authenticated.

The ocular symptoms occasioned by cycloplegic derivatives from the *solanaceæ* order are probably of peripheral origin. The poison acts by paralyzing the ends of the third nerve distributed to the ciliary muscle and sphincter iridis as well as, *perhaps*, by stimulating the sympathetic dilator fibers.

General as well as local symptoms from the use of other cycloplegic agents are too well known to spend much time upon them.

Kollock (160), in common with many others, the author included, has observed serious symptoms after the instillation of such a small amount as $\frac{1}{60}$ gr. of *duboisin*.

Ziem (161) as well as de Schweinitz and Hare (162) report cardiac weakness after the local use of *homatropin*. Harlan (163) has seen the same drug bring on slight attacks of glaucoma, while Cheney (164) witnessed what he terms "hysterical" mydriasis and blindness following the use of the hydrobromate.

Testi (165) saw well marked cycloplegia and mydrasis in a family poisoned by *hyoscyamus albus*.

Treatment. Owing to its stimulating action upon the third nerve center, opium, and especially hypodermic injections of morphia, in full doses is the most appropriate and most useful form of treatment in cases of poisoning from the cycloplegic alkaloids. McGowan (166), in a case of typical intoxication following a teaspoonful of belladonna liniment, used hypodermic injections of pilocarpin with gratifying results.

Although *nicotine* and *eserine* stimulate the nerve endings of the oculomotorius, their miotic action is feeble, and even large doses do not neutralize the ordinary paretic effects of belladonna or hyoscyamus. The statement of Loring (167), that no visible changes in the retinal vessels are produced by poisoning, agrees entirely with the results of my investigation (page 177) of opium amblyopia.

Opium and Morphia. The experiments of Picard (168) on dogs, and the observations of Laborde (169), in a case of chronic poisoning from morphia, would appear to prove that these agents do occasionally affect the optic nerve and retina and so produce visual disturbances. In addition to Wagner's case (37) previously quoted, Schreiber (170) observed agraphia and alexia after acute poisoning. Schiess-Gemuseus (quoted by Knies), reports a case of a man, aged 65, who, after taking a morphia sleeping powder and having slept thirty hours, became almost blind and deaf. He not only had, after an interval of three weeks, a right-sided hemianopia but a persistent contraction of the visual field on the left side. The right papilla presented the appearance of a tobacco disc, *i. e.*, hyperemia of the nasal half with palor of the temporal side.

Aconite. Many other observers besides O'Brien (38) and Hooper (171) have recorded *mydriasis* without cycloplegia as the chief ocular symptom of aconite and aconitia poisoning, although Haakmar, and a few others, in a case (172) from aconitia nitrate mention this sign as alternating with miosis. In a fatal case from the nitrogallate of aconitia, Buscher (173) noticed that the patient had attacks of complete blindness. Woodburg's case (174) exhibited misty vision and diplopia.

Chloral and Its Hydrate. Most authors agree with Griffith (175) that after the continued use of chloral, the pupil almost invariably becomes contracted, but later on psychic alterations set in and then the pupillary contraction gives place to dilatation. The *miosis*, which is the symptom most commonly observed, is associated with loss of the normal pupil-dilatation-reflex from irritation of the sensory nerves in the ocular neighborhood. This contraction of the pupil is the result of paresis of the sympathetic nerves supplied to the iris.

Usually there are no fundus changes, although Berger speaks of a congestion of the papilla, when *mydrasis* is present, due to congestion of the retinal veins. Ulrich (176) says that in the later stages slight pressure upon the globe is sufficient to force the blood out of the papillary vessels and that the intraocular tension

is lessened. There is then an anemia of the retinal vessels. Cheatham (177) has had two cases of photophobia and conjunctival hyperemia, which he ascribes to chloral, having seen them follow a single dose of 15 grains. Visual disturbances, due to organic alterations, are very rare.

Mittendorf (178) had a patient who had been taking 2.5 to 3 grms. of chloral hydrate daily. There were greatly impaired vision and small central scotomata for red and green, while the papillæ were muddy. Chloral stopped and strychnia administered. Improvement began in four days; in three weeks vision was two-thirds with no scotoma. Kirkpatrick Murphy (180) observed in a woman, 58 years of age, who took 150 grains daily, dimness of sight, eyes bloodshot and constantly watering, pupils dilated and temporary amaurosis lasting two days.

Treatment. Very little is known about it. C. J. G. Sinclair Coghill (179) is an advocate of amyl nitrite, and in a case of complete miosis from chloral used the former remedy with success.

Eserine. Although this agent, as well as extracts of Calabar bean, are well known miotics when used locally, yet systemic intoxication generally causes *dilatation of the pupil.* C. Aragô (181) has seen complete, though temporary, blindness follow general eserine poisoning in a 10-year old child, which, by the way, most commonly results from its instillation into the conjunctival sac.

Pilocarpin and Jaborandi. Locally always powerful miotics, the chief eye symptom in *general* poisoning is, as with physostigmine, mostly *mydriasis.* Fuhrmann (182) relates a case of luetic papillo-retinitis in which a hypodermic injection of 0.01 grm. of pilocarpin was given. Alarming symptoms set in accompanied by an amblyopia lasting two hours and a half. The patient could not recognize a person at 20 centimeters, although his left eye before the poisoning had normal vision. In an article on the subject Landesberg (183) gives his experience of five cases treated with pilocarpin and jaborandi in which he observed sooner or later a quickly developed *cataract.*

Says Berger, "although exceptional cases of transient amblyopia or of cloudy vision are commonly explained by the hypothesis of a disturbed intraocular circulation, it is more probable that pilocarpin, in poisonous doses, temporarily paralyzes the peripheral fibers of the optic nerve."

Coffee and Caffein. Strong solutions of caffein and its salts applied to the cornea act as a weak mydriatic and anesthetic.

Hutchinson (184) refers to a case of caffein amblyopia, the symptoms of which resemble those of the amblyopia of quinin intoxication.

Aniline and Its Salts. Almost every observer has noticed *mydriasis* and *accommodative paresis* as the chief signs of chronic poisoning. In Leboir's case (185) the dilatation was extreme. Müller (186), on the other hand, observed bilateral miosis. There was defective vision, Jaeger XIX, in each eye, (which improved when the patient abandoned his injurious work) in a case reported by MacKinlay (187).

Coal Gas and Its Combustion Products. Intoxication from poisonous combustion products, especially from carbon monoxid and *carbon dioxid*, as well as from the *hydrocarbons* and other compounds in *illuminating gas*, is occasionally accompanied by ocular symptoms. This is not to be wondered at when one remembers the widespread organic alterations, particularly capillary hemorrhages and fatty metamorphoses found after death in brain, nerves, muscles, kidneys, etc. *Where recovery occurs the eye symptoms are usually due to similar changes in various parts of the visual apparatus.* The minute hemorrhages, that also occur in phosphorus poisoning, are the results of fatty degeneration of the capillary vessels.

A most interesting history is given by Knapp (198). The patient, exposed to the fumes of an imperfectly covered stove, suffered from loss of consciousness after which he had paralysis of several ocular muscles. In the course of two months there was partial recovery, the paralysis being then confined to the ciliary muscle and sphincter pupillæ.

Illing (189) reports a case of homonymous hemiopia due to cerebral disease, while Emmert (190) more recently records a paresis of the third nerve (left eye only) associated with a partial trigeminus and facial paralysis. Recovery in this case was almost perfect.

Retinal hemorrhages have been observed by Becker (191) and others. In Becker's case there was marked congestion of the retinal veins.

Pure carbon dioxid poisoning presents no constant eye symptoms. A mechanical congestion of the retinal veins, as a part of a general venous stasis partly due to asphyxia, has been noticed in association with fundus hemorrhages. Sometimes the pupil is dilated; sometimes contracted. Ball (192) records a curious fact: while the patient was suffering from the effects of the poisonous inhalation the pupils dilated when light was allowed to fall upon the eyes and they contracted in the dark!

Herpes zoster affecting the eye through alterations in the ocular branches of the trigeminus has been observed by Sattler (193).

PHOSPHORUS. There is a close resemblance between the morbid changes in the tissues of persons affected by this intoxicant and those of persons poisoned by one or both of the oxides of carbon. The ocular symptoms and tissue alterations are for that reason much the same in both instances. In chronic intoxication, [Michel (194)] affecting workers in match factories, for example, hemorrhages and patches of degeneration in the retina are sometimes seen. The latter are composed of the altered (fatty) external granular layer, mixed with crystals of tyrosin. The process begins with a fatty degeneration of the retinal capillaries in the same way that phosphorus poisoning affects the smaller vessels elsewhere; an ophthalmoscopic picture that resembles the retinitis of albuminuria.

SULPHURIC ACID. This is a rare cause of visual disturbance. Salomonsohn (195) reports a case of acute polioencephalitis superior (produced by poisoning from this acid) which in its turn caused progressive paralysis of the eye muscles, ending in complete ophthalmoplegia. The patient recovered and the eye symptoms disappeared. Georges Martin (196) also publishes an instance of blindness, the result of sulphuric acid poisoning.

ETHYLENE DICHLORID. Dutch liquid. This colorless, inflammable fluid has been used as an anesthetic, especially under the modified form of *ether anestheticus aranii*. Raphael Dubois (197) noticed that after inhalations of it, dogs and rabbits acquired persistent opacities of the cornea. Panas (198) believes these to be due to serous infiltration of the true substance of the cornea dependant upon a destruction of portions of Descemet's membrane by the ethylene chlorid. In this way the parenchyma is exposed to the action of the aqueous humor.

POTASSIC BROMID. In addition to the case already detailed (*vide ante*) Schweig (199) reports a case in which slight *mydriasis*, lasting several days, and conjunctival catarrh were the principle ocular signs of the bromism. Berger attributes the dilation of the pupil either to the paretic action of the bromid on the sphincter pupillæ or to a contraction of the vessels of the iris. The amblyopia is probably due to the mydriasis, as no fundus changes have been reported.

IODIN AND IODIDS. Edema of the lids, as in Hewkley's case (200), accompanied by lachrymation and pains in the eyes, as seen in the case of Lorenz (201), constitute the ordinary symptoms of ocular iodism, as part of a general intoxication.

The following histories must be regarded with suspicion, as the alleged ocular poisoning occured in patients with syphilis. Ehrmann (202), in a case of acute iodism, observed not only the usual symptoms just mentioned, but in four instances severe trigeminus neuralgia with tender "pressure" points. These disappeared when treated by quinin.

I present the following case: "Mrs. M., 36 years of age, in November, 1893, observed failing vision. It seemed as if a cloud were floating before the eyes. She applied for treatment to a well known ophthalmologist, who prescribed potassic iodid in increasing doses, combined with 'mixed treatment.' Has taken 200 grains of K. I. at a dose. After being under treatment for several months it was noticed that when the iodid was stopped vision improved, and invariably got worse when full doses were resumed. Finally, the surgeon was obliged to return to very small doses and at last to stop the drug altogether, owing to its untoward effect. Patient afterwards consulted me and I had a similar experience with her. The lesion was a *kyalitis* (V., R. $= \frac{20}{200}$; V., L. $= \frac{15}{200}$) which eventually greatly improved."

Methylen Bichlorid. This anesthetic fluid, allied to chloroform and said to be a mixture of it and methylic alcohol, produces eye symptoms the direct opposite of the former (*q. v.*) viz: *miosis* in the first stage of the narcosis, but *dilated pupils* in the later stages.

Chloroform. Aside from the condition of the pupil in the various stages of chloroform narcosis there are no ocular symptoms, properly so called, pathognomonic of this intoxicant. Niemann (203) records a case of acute poisoning from drinking chloroform: the man first presented contracted and, later on, dilated pupils.

Schlaeger (204), Vogel (205) and Budin (206) have made elaborate studies of the pupillary reflexes in persons under the influence of chloroform, investigations that add very little to the everyday experience of the surgeon.

During the period of excitement the pupil is dilated, but as the inhalation proceeds and the medulla and cerebral centers become paralyzed the pupil contracts—a well marked miosis indicating that the anesthesia is complete.

Ether. The pupillary signs are much the same as with chloroform, but Jacob (207) noticed, six times, mydriasis instead of miosis in the stage of deep narcosis out of 1200 etherizations. As a result of a study of these signs Warner (208) reports a disassociation of the usual binocular movements under chloroform which is not exhibited by ether.

Detachment of the retina, probably as the result of efforts at vomiting, has been recorded by several observers, *e. g.*, by Schirmer (209).

ANTIPYRIN. Wicherkiewiez (210) claims that this drug produces an amblyopia similar to that of sodic salicylat. Guttman (211) observed in a debilitated woman, 25 years of age, a complete though evanescent blindness, which came on after a dose of 15 grains.

NITROBENZOL. Another case described by Nieden (212), should be added to Litten's (55) report. A workman in a "roburite" factory suffered for two weeks from general poisoning, difficult respiration, cardiac palpitation, vertigo, nausea, weak pulse, etc., before the eye symptoms set in. These were failing sight (the visual acuity being reduced in either eye to $\frac{1}{20}$) and gradual but marked contraction of the F. of V. After an interval of four weeks improvement set in. The ophthalmoscope showed a decided hyperemia of the veins with (in one eye) a large retinal hemorrhage.

SULPHONAL. Two histories are of interest. Knaggs (213) publishes the earlier case in which, in addition to general anesthesia, loss of sensation in the conjunctiva was noticed. Dillingham (214) reports a case of intoxication where a temporary ptosis lasting two weeks, formed a principal symptom of the poisoning.

CHRYSOPHANIC ACID. A. Trousseau (215) has recorded a case where alleged eye symptoms followed the application to the skin of a 10 per cent ointment. The inunction produced an acute hyperemia of the conjunction that disappeared in a few hours. This, the writer found, differed entirely from the conjunctivitis caused by the direct application of the ointment to the conjunctiva itself, the latter affection persisting for eight days.

SAPONIN. So far as I know there is on record but one case of intoxication from this agent, (a white, inodorous, sweetish-acid, glucoside, derived from *saponaria officinalis*) where a claim of eye symptoms has been set up. These followed the use of the drug upon the person of Fr. Keppler (216) who was at the time experimenting with saponin for the purpose of determining its value as a local anesthetic, and consisted of very severe pains, strabismus and exopthalmus of his left eye.

ESCULUS HIPPOCASTANUM. Horse Chestnut. *Esculin*, a white, bitter, crystalline glucoside, obtained from the bark; dose, 15 grs. in malaria.

Salomon (217) describes the eye symptoms produced in a boy, 3 1/2 years of age, from eating the green rind of the fruit. They resemble those of atropia poisoning—widely dilated pupils, staring vision, scarlet face, bounding pulse, etc.

PODOPHYLLUM. Chemists' assistants, who grind certain irritant drugs, are prone to acquire conjuctival hyperemia, as well as acute inflammation and even corneal ulcers, unless the eyes are protected by a mask from the dust. Such is the case with podophyllum, as with many others that it is not within the province of this study to mention. For example, Dr. Cheatham, of Louisville, informs me that in preparing *jequirity* powder, which he uses extensively, he has known the irritating dust set up the most violent and serious inflammation of the anterior portion of the eye, threatening the destruction of the whole organ.

HELLEBOREIN. This alkaloid belongs to a rather large class, of which cocain is the chief representative, the local anesthetics.

Erythrophlaein, (from *E. judiciale*); "*haya poison*," (from E. guineense); apomorphin; alpha kava resin (from *piper methysticum*) and "toad poison" (27) also produce anesthesia of the cornea and conjunction, but, owing to the pain and inflammation they produce, are not employed in surgery,

HYDROCYANIC ACID AND OTHER CYANIDS. Either the eye signs of poisoning from the cyanids are various and inconstant or else the amblyopia assumed to follow this form of intoxication is partly or wholly due in the three published cases to other causes. The symptoms of each differ from those of the other two and they represent every case I could find in literature. H. de Tatham (218) reports, as the result of exposure to the vapor of dilute hydrocyanic acid, a temporary hemianopia, that disappeared in a few hours. G. F. Souwers (219), in a photographer poisoned by potassic cyanid, remarks swelling of the upper lids and sluggish pupils. Müller-Warneck (220) saw completely dilated pupils, with absent irritation reflex and proptosis, in a case of intoxication from cyanid of potassium; the patient recovered.

SPT. ETHERIS NITROSI. Hill (221), while describing a case of acute poisoning from 3 ounces, in a boy 3 years of age, mentions dilatation and immobility of the pupils. The post mortem examination showed highly congested cerebral veins.

The following list of drugs and poisons receive briefer mention, either because the original article describing the toxic amblyopia in question is not accessible to me, or because the eye symptom or symptoms have a doubtful connection with the intoxication, or because the alleged amblyopia is the only recorded instance of the untoward effect of the agent upon the eye or is the result of physiological experiments upon the lower animals only. I do not doubt, however, that a number of the cases are genuine examples of toxic amblyopia.

Nitroglycerin; ophthalmoplegia as a late sympton, Nieden.[1]

Chromic acid; a 5 per cent solution applied as a remedy for perspiring feet has produced temporary *yellow vision.*

Hydracetin; in one eye small retinal hemorrhages, attributed by Grünthal (222) to inunction of salve containing the drug; the urine contained much albumen.

Antifebrin; Simpson[2] reports contracted and motionless pupils after 105 grains in two and a half hours.

Curare poisoning also produces, as a late ocular symptom, miosis.

Marsh gas, "choke damp," believed by Von Reuss (223) to be the cause of "miners' nystagmus."

Oxalic acid; Koch (224) experiments on rabbits; mydriasis at first, followed by contraction of pupils.

Menthol; Charrin and Rogers' experiments (225) on rabbits ($^5/_7$ gram. caused death in five to ten minutes) showed post mortem opacities in the lens.

Coniine, from *conium maculatum;* inhalations of solution caused [H. Schulz (226)] lachrymation, burning of conjunctiva and inability to hold the lids open.

Gelsemium sempervirens, according to Ringer, causes contraction of the pupil taken internally, but mydriasis when applied locally.

Cytisin, from *cytisus laburnum.* Albutt records dilated pupils, pallor of the nerve and small retinal vessels.

Creolin; three cases of "black vision" by Bitter (227).

Resorcin; Hirschberg (228), *conjunctivitis* after application of ointment to the face.

Ether petrolei; case reported by Leidy (229) of bilateral mydriasis, motionless pupils and nystagmus followed by recovery.

Nitrous oxide; an additional observation of Bordier (230), a temporary though very marked *miosis* an hour after the extraction of a tooth.

Toluylendiamine; Stadelmann (231), intense yellow discoloration of sclera in animals.

Strychnia poisoning rarely produces eye symptoms, except possibly dilated pupils and engorged retinal vessels during the convulsions.

Sulphur ointment, (vaseline 100, wax 5, sulphur 10); applied for eighteen years, said by Eichbaum (232) to have produced, with other symptoms, an amblyopia of the atropine type.

[1] Quoted by E. Berger, *loco cit*, p. 408.

[2] Knies, *loco cit.*, p. 345.

Piscidium; from the extract, *mydriasis*, Seifert (233).

Bromoform; pupils dilated *ad maximum* and unaffected by light, Sachs (234).

Salicyl; Rosenberg (235) reports *exanthema bullosum* affecting the anterior parts of the eye.

Oil of anise; Cadiac and Menuier (236), locally, conjunctivitis and keratitis; internally, lachrymation.

Leucomaines of hydrophobia; Penzoldt (237), severe pains in eye from infection of conjunctiva.

PATHOLOGY AND TREATMENT OF THE MOST IMPORTANT OF THE TOXIC AMBLYOPIAS.

Tobacco—Alcohol.. The discovery was made in 1882 by Samelsohn (238), of Cologne, from an examination of the optic nerve of an amblyopic patient and confirmed in the same way by Lawford and Edmunds (239), Nettleship and Edmunds (240), Uhthoff, Sachs (241) and others, that the essential lesion in this disease is an axial interstitial neuritis, beginning somewhere betweeen the papilla and the brain and probably extending thence towards both the center and the periphery. As was suspected by the earlier authorities it is the fibers that supply the macular region (one-fourth or one-third of the whole) that are affected: the others generally escape. Although such a conclusion might with almost perfect certainty be prophesied from the fact that central negative scotomata are nearly always constant factors in the disease, yet the confirmatory evidence of autopsies was needed. From these post-mortem observations (thirteen to the date of writing) we may conclude that the fibers supplying the fovea centralis and surrounding macular region, when they appear at the papilla, form a wedge-shaped sectar and lie on the temporal side of the optic disc.[1] After reading the descriptions of the various autopsies referred to, which are given with elaborate preciseness by the various writers, one is forced to the conclusion that the course of the papillo-macular fibers is not an invariable one in every individual, Nor do I think it likely, from what we know of the variations in size of the negative scotomata, that the nervous degeneration is strictly limited to this or that particular bundle supplied to the macular region. In Uhthoff's work, reproductions of the microscopical sections are given showing the relation of the

[1] For example, see Paul Bunge's *Ueber Gesichtsfeld und Faserverlauf im optischen Leitungsapparat,* Halle, 1884, and H. Wilbrand's *Die hemianopischen Gesichtsformen und das optische Wahrnehmungscentrum,* Wiesbaden, 1890, both with beautifully colored plates and diagrams.

diseased (papillo-macular) bundles to the healthy nerve fibers in their course from the tractus opticus to the disc. This course corresponds very closely to that found by Uhthoff in a case of absolute central scotoma, the result of tabes dorsalis.

As to the *form of the neuritis* it must be remembered that the axis cylinder and the true nervous elements of the opticus escape; the resulting atrophy of them is a simple and not a numerical one. Indeed, one of the strongest arguments that is urged in favor of an alcoholic origin for many of these cases of central amblyopia is that we find in the optic nerve almost a typical picture of the havoc which alcohol plays in the tissues of other organs, namely, a morbid increase in the connective tissue element of the organ. The trebecular fibers, increasing as to number and size, press upon the true nervous structures and cause their atrophy, just as they effect the atrophy of organic elements elsewhere.

In Stiltzing's case (242) there were marked new vascular and connective tissue formations with abundant increase of nuclei in the interstices. The meshes were diminished in size, a portion of the nerve fibers being atrophic, the nuclei present being closer together than normal, but not numerically hypertrophied.

In much the same way, allowing for differences in structure, are brought about the cirrhosed liver, the fibroid phthisis and the peripheral multiple neuritis of drunkards. If multiple peripheral degenerative neuritis occur in other nerves from alcohol, why not also in the optic nerve? Many instances might be quoted where degenerative changes in peripheral mixed nerves have occurred as a result of chronic alcohol poisoning. Lilienfeld has described a case of alcoholic paralysis of both nervi abducentes and of other peripheral nerves. Hadden found, post mortem, in a very intemperate man, 56 years of age, afflicted with alcoholic paralysis and dead of an intercurrent disease, "most advanced changes in the musculo-cutaneous nerves of the legs, wherein numerous empty and collapsed nerve tubes were seen, the granular material having disappeared."

Oppenheim (244) gives five cases of alcoholic paralysis, but none with affections of vision.

Lancereaux (245) found, post mortem, in a chronic alcoholic female, 48 years of age, with paralysis of the extremities, normal nerve centers, but lesions of the peripheral nerves. These consisted of an advanced granulo-fatty degeneration of the nerve fibers.

One of the most instructive cases yet published, where atrophy of the opticus occurred with peripheral neuritis elsewhere, is recorded by Myles Standish (246). I abstract the history, as follows:

Man, seen by writer in September, 1884, a well marked A.-T. amblyope, 52 years of age. Vision grew slowly worse, until he could barely distinguish people on the street. Finally V. = perception of light, and there was pronounced gray atrophy of the discs. He then passed through all the phases of multiple peripheral neuritis affecting the lower extremities, with pronounced mental symptoms, atrophy of leg muscles, etc. In September, 1886, he had improved so that he could walk up and down stairs. V. = $\frac{1}{10}$, but memory impaired and absent knee jerks. F. of V. nearly normal and no color scotomata. Blue-gray atrophy and small vessels.

Dr. Standish has collected forty-four cases of alcohol paralysis with reference to the eye symptoms and finds that in seven there were no fundus changes; ten had congested discs; four white discs and two had discs white on the temporal side; three had large pupils that reacted slowly to light, *i. e.*, 43 per cent, at least, had definite eye symptoms. The writer thus ends his interesting article: "the association of a multiple peripheric neuritis, the pathology of which is known, with a toxic amblyopia, the pathology of which is unknown, is particularly interesting and it does not seem improbable that the morbid processes may be identical. In both diseases the tendency of the disease is to recovery if the use of the toxic agent can be prohibited."

Sachs (247), in a recent and exhaustive study of this whole subject, emphasizes the resemblance, first pointed out by Samelsohn, between the ravages produced in the optic nerve by poisons of Class 1, Div. 1, and those changes that mark the cirrhotic liver. "In both diseases," says he, "the process affects the interstitial connective tissue and in both the essential tissues of the organ (nerve fibers and hepatic cells) suffer secondarily from pressure upon them. The analogy may, I think, be carried still farther. The areolar hyperplasia and cellular infiltration, characteristic of interstitial hepatitis, do not bear any constant relation to one another and are not dependent upon one another. In the same way, as shown in the microscopical examination of my patient's optic nerves, the areolar hypertrophy and the cell proliferation appear to be entirely independent of each other, the latter being generally conspicuous by its absence. Nor do I believe that a widespread cellular infiltration could have preceded the connective tissue hypertrophy without showing unmistakable evidence of its

existence, when one recollects that the optic nerve disease lasted until the death of the patient, only a year and a quarter.

The remarkable increase in the number of the neuroglia cells within the diseased bundles is also noticed by Samelsohn. If one accepts the latest theory of the epithelial origin of the neuroglia[1] it would not be improper to compare this process with the commonly observed proliferation of epithelium within the bile ducts. At any rate one effect of this tissue change is to compress and injure the nerve fiber bundles themselves.

The parallel between hepatic cirrhosis and neuritis interstitialis is still more striking when the vascular changes in our case are noted. These frequently occur in the first mentioned affection and consist of endothelial proliferation resulting in thrombotic closure of some vessels, occuring side by side with new vascular formations."

Sachs believes that the process, in his case at least, began not simply in the usual situation (the distal part of the nerve near the chiasma) but as a proliferating endophlebitis of the *vena centralis postica*, occasioning its obliteration and the formation of new capillary blood vessels in its neighborhood.

He thinks, with the English school, that in the mixed cases alcohol merely predisposes to the amblyopia by producing dyspepsia—in the form, usually, of a chronic gastric catarrh—and so interfering not only with the digestion but also with the assimilation of the food. He further believes that the normal gastric juices, undergoing secondary changes of the fatty acid variety, form complex chemical combinations with the nicotine which are either more readily absorbed into the system or are with greater difficulty eliminated from it. The evidence of such abnormal changes occurring in the stomach he finds in the *acetone odor* with which the breath of patients is laden and compares the condition to that of diabetic-tobacco amblyopes whose urine contains butyric acid. In answer to the argument in favor of alcohol as against tobacco (in bringing about the optic neuritis of toxic amblyopia) that while the former is known to produce changes (peripheral neuritis, atrophy, paralysis, etc.,) in other portions of the nervous system these effects have never been shown to result from the abuse of tobacco, Sachs adduces the clinical evidence, the rarity of pure alcoholic amblyopia and the fact that the changes in the nervous system set up by alcohol elsewhere are unlike those found in the

[1] Edinger. Zwölf Vorlesungen ueber den Bau der Nervösen Centralorgane, 1892, p. 31.

optic nerve in the mixed cases. When the ocular apparatus is affected in pure alcoholics the *eye muscles*, *i. e.*, their nerve supply, and not the optic nerve are most likely to suffer.

Horner (248) goes still further. He is convinced that neither alcohol nor tobacco, *as such*, produces the pathological changes in the opticus. They act by inducing gastric catarrh and so interfere with the general nutrition as to bring about such alterations in the nerve that follow certain cases of anemia, chronic discharges, etc. However, the rarity of retrobulbar neuritis in chronic dyspepsia not associated with alcohol, as well as its infrequency in cancer, tuberculosis and similar affections form a strong argument against Horner's extreme views.

The pathology of the central (red, green—sometimes blue and white) scotomata in *diabetic* smokers and drinkers is not clearly defined. That these defects occur in the diabetes of strictly temperate patients is undoubted and the fact seems to confirm Horner's views of the causation of A.-T. amblyopia generally, since the impression remains that the central defects flow from the malnutrition attendant upon the glycosuria rather than upon a special intoxicant. This may be said with some degree of certainty: *When the central field for blue or white is affected the neuritis is of glycosuric origin* and the prognosis is grave, *i. e.*, the case usually goes on to simple atrophy. W. O. Moore's excellent paper (249) on this subject is of great interest.

On the other hand, and in view of the fact that tobacco does not produce visible organic changes in nerves elsewhere,[1] it is thought by some that the orbital neuritis of toxic amblyopia can not be due to nicotine. Hirschberg believes, at any rate, that tobacco may so affect the smaller retinal vessels supplying the macula as to produce an ischemia of that region. Berry also denies the theory of a retro-bulbar neuritis, believing that the poisonous effects of tobacco are expended on the cerebral origin of the papillo-macular fibers and postulates a common center for these in the brain. As an opportunity for an examination of the whole course of the optic nerve in toxic amblyopia rarely occurs, and since not more than two cases of pure tobacco or alcoholic amblyopia have thus far been examined, one cannot state posi-

[1] A few observers claim that it does. In an article contributed to the *Recueil d'ophtalmologie*, 1885, page 98, Jan records a case of unilateral paresis of the third nerve in a man 42 years of age, otherwise healthy, but addicted to the inordinate use of tobacco. The author argues that this can only be an instance of peripheral nicotine neuritis.

tively in what respect, if any, the lesions in the "pure" cases differ from the mixed cases referred to, or how they differ from one another. *A priori* reasoning would lead us to believe that the organic changes are practically the same in all cases of toxic amblyopia of which relative scotomata form a prominent symptom. But this certainly needs confirmation, not only in respect of tobacco and alcohol alone, but in the amblyopia due to *carbon bisulphide, cannabis indica and iodoform.*

Sachs calls the fibers that first undergo degenerative changes and from which these spread to surrounding parts the "nuclear group" ("*kern-gruppe*") as it is here that the most destructive and best marked alterations are almost always to be found. These proceed until the papillo-macular bundles are affected; but the morbid process does not reach such a high degree in the latter, and thus it is easy to understand why an absolute defect is never found centrally and why the disease in this region is usually reparable. The alterations do not affect the nerve fibers themselves but merely the areolar septa, in the form of hyperemia and edema, so that the *true nervous tissue enclosed by the former are merely temporarily injured.* Thus the curability of a recent amblyopia may be looked for with certainty.

Regarding the anatomical explanation of that important ophthalmoscopic sign in tobacco-alcohol amblyopia, decoloration of the temporal half of the papilla, I quote further from Sachs (*q. v.*): "the physical explanation of this condition has not hitherto been sufficiently dwelt upon. Gowers considers it as due to a disappearance (atrophy) of the capillary vessels and a reduction of the red element in the normal color of the disc.

"Of more importance and easier of demonstration is the influence of the atrophy on the coloration of the papilla. The contraction of the areolar spaces of the lamina cribrosa and the marked aggregation of their trabeculæ, in consequence of a diminution in size of the nerve bundles that pass between them, must increase the quantity of light reflected from the anterior surface of the lamina itself. Moreover the thinning of the *overlying* nervous layer contributes largely to the same result. This phenomenon is really a 'contrast' effect, the remaining area of the papilla being either of the normal reddish color or made still redder by a hyperemic condition often present.

"The histological changes seen in sections of the nerve trunk, on both sides of the point of entrance of the retinal vessels, differ from those found in the latter region in that in the former the

hypertrophied connective tissue is unaccompanied by cell proliferation, while at the vascular entrance the alterations present inflammatory changes within some of the bundles and about some of the vessels."

The correspondence of the temporal triangular wedge to the papillo-macular bundles of fibers is beautifully confirmed in a case reported by Knapp (250) where, in an absolutely temperate girl, 18 years of age, *a coloboma of the macula lutea*, with the usual opticus sector plainly atrophied, was discovered by the ophthalmoscope.

PROPHYLAXIS AND HYGIENE.

It is proper here to say a few words about prophylactic treatment, although the precautionary measures desirable in the case of persons exposed to the deleterious action of the toxic agents we have been considering, will appeal to the common sense of every medical man.

It need hardly be urged that a well informed practitioner should remember how large a number of the commoner drugs which he is called upon to use in daily practice, may, in some patients and under certain conditions, be hurtful to the eye, or may interfere with its function, and that he should not neglect these danger signals of disease when they display themselves and so diminish the dose or entirely stop the remedy.

Other precautions suggest themselves. It has been noticed, for instance, that most cases of carbon disulphid amblyopia occur during those seasons of the year when windows and doors are shut and ventilation is imperfect. It is imperative, therefore, that in rubber or other factories, where this agent is employed, the strictest attention should always be given to devices for carrying off the volatile fumes and for their dilution with an abundant supply of fresh air.

One of Delpech's patients (251) designed the following apparatus for avoiding inhalation of carbon disulphid fumes: "In a chamber which can be freely ventilated through its two extremities, a horizontal board is fixed to the sides by its two ends; from its anterior edge a board descends to the floor of the chamber; from its posterior rises a vertical plank, fourteen inches high; this is pierced by three pairs of apertures so arranged as conveniently to give passage to the hands and forearms of three workmen. From the upper border of this vertical plank a sheet of glass passes upwards and forward, and allows the

workers to see their hands. The closure of the chamber is completed anteriorly, so that the only communication between it and the remainder of the room is through the six circular apertures. These are protected by impermeable and supple india rubber, which fits closely to the wrists of the workers by means of bracelets. The workmen sit with their legs beneath the horizontal table. All the operations are carried on within the chamber. It is stated that no odor was perceptible, and that although the operations were slightly retarded they were not so to any inconvenient extent."

Workers in *white lead* manufactories should be especially careful to keep their hands and finger nails clean and free from the poison, and when engaged in dry mixing should wear respirators. According to Berger, in the large lead works of Ivry, near Paris, ideally conducted from a hygienic standpoint, the workmen never suffer from symptoms of saturnism.

Under the heading "Prevention of Industrial Lead Poisoning," the *British Medical Journal* (II, 1893, page 1345) has the following:

The Departmental Committee, appointed by Mr. Asquith to inquire into the white lead and allied industries, and to suggest any precautions necessary for the protection of life and health, has presented its report. The greatest change recommended is the exclusion of females from all direct contact with white lead. In some works this is already done, and it is believed that the total number of women who would be displaced if this recommendation was carried out would not exceed 600. Further, they recommend that no female under 20 should be employed in white lead works; that before employment women[1] should be submitted to medical examination, and that in both sexes a medical certificate should be required after absence through illness before return to work. They recommend that women should be required to wear overalls and head-coverings, and special shoes and stockings, while engaged in certain parts of the works. With regard to the enameling of iron plates, the recommendations are very similar; and it is proposed that in color works, also, the employment of females and male "young persons" should be prohibited, and that in lead smelting these two classes should not be permitted to clean the flues; further, that nobody should be allowed to work in the flues for more than two hours at a time, nor leave afterwards before taking a bath. The provision of special lavatory accommodation is advised in color works, lead smelting, yellow lead, electric accumulator, turning and enamelling of iron hollow ware, and red and orange lead works, and in the last it is recommended that all persons employed should be submitted to a weekly medical

[1] T. Oliver (Gulstonian Lectures, 1891, I.) found that women exhibit a greater susceptibility to lead poison than men. Of 135 cases noted by him in the Newcastle Infirmary 91 were women and 44 men. C. A. W.

inspection. In the case of white lead and the enamelling of iron plates and hollow ware, the provision of a dining room is recommended. The report contains a large number of proposed regulations directed to prevent poisoning through dust or by want of personal cleanliness, specially adapted to the needs of each industry, and it is proposed that the usage which obtains in the case of accidents—a compulsory report to her Majesty's Inspector of Factories and the certifying surgeon of the district —should be extended to cases of lead poisoning.

If in popular works on personal hygiene, as well as in lectures and essays prepared by members of the profession for the guidance and enlightenment of the laity, certain facts connected with the loss of vision sometimes produced by indulgence in tobacco and alcohol were set forth (without the exaggeration which sometimes characterizes the statements of prohibition and teetotal enthusiasts) it would at least serve as a warning to smokers and drinkers to cease or to moderate the, to them, abuse of these stimulants. The medical man should warn patients (those over thirty years of age particularly), with dyspepsia or other diseases affecting nutrition, that their smoking and drinking are very likely to lead to loss of vision through disease of the optic nerve.

The assertion frequently made by me, that obscure ocular symptoms or a transient amblyopia often accompany the medicinal employment of our common drugs—quinin, salicylic acid, iodoform, cannabis indica, etc.—and the daily use of tobacco, alcohol, tea, coffee and chocolate, is worth bearing in mind as explanatory of occasional attacks of weakened sight.

It is not intended to discuss, except very generally, the treatment of those concomitant troubles which so often afflict toxic amblyopes unless they have a direct bearing upon the visual failure. It need hardly be said that all the toxic symptoms should be treated together.

Whatever be the form of poison that has caused the amblyopia, it should at once be discontinued. To this general rule there are, however, some exceptions. When the physician discovers that his patient does not entirely abstain from the deleterious agent he must be content with regulating its amount and time of indulgence; and he will often better accomplish this by allowing him to take a definite quantity than by attempting to force him to go without it altogether. Hutchinson and others do not restrict the amblyope in the matter of beer or wine, if taken in moderation, but sternly forbid the use of all forms of tobacco. On the other hand, Minor finds his patients make excellent progress toward recovery when no embargo is laid upon their smoking or chewing. The obser-

vation that total abstinence is not a necessary factor in treatment has been made by many observers. Hill Griffiths, for example, as well as Lawford and Nettleship refer to it. Still, one can not help believing that in such cases the patient *recovers in spite of the poison and not in consequence of it*, and so convinced am I, from observation of the behavior of patients treated with and without a continuance of the intoxicant, that a quicker cure is reached in cases of entire abstinence that I consider it desirable to impress the patient with the idea that the length of time necessary for a cure will to a large degree depend upon the extent to which he indulges in his old habits. If, however, it is considered desirable to allow the patient to continue his tobacco or alcohol or both, he should be given moderate quantities of beer or light wine, taken only after meals, and he should smoke (not chew) a small quantity of mild tobacco, or one cigar, daily, and always after eating.

Next to abstinence from the evident cause of the disease is the recovery of the systemic tone which is nearly always lost in toxic amblyopia of the first class. So far as possible a return should be made to a normal condition of health. The regulation of the bowels, attention to kind of food, care in personal habits, etc., are of great importance. *The digestive power is frequently weak and should be fortified by appropriate means.* Gastric catarrh or other form of dyspepsia is almost always present. Bitter infusions and tonics are nearly always of value, indeed, it is probable that, to the tonic effects of certain specifics used in this disease, most of their value is due. Out-door exercise will be useful to those of sedentary occupations. The use of Turkish baths has been highly recommended, and in alcoholic cases especially has a decided value. In these various ways a much needed supply of good blood is carried to the badly nourished optic nerve tissue.

Coming to the so-called specific remedies, preparations of *nux vomica, strychnia particularly*, are very useful, especially in pallor of the disc and when general toxic (nervous) symptoms are present. Decidedly the most effective method of exhibiting strychnia is by hypodermic injection, beginning with a small dose, say gr. $\frac{1}{50}$ once daily, and gradually increasing it until dryness of the mouth, stiffness of the muscles of the jaw and jerking of the extremities are produced. My practice is to order a fresh one per cent solution (for easy determination of the dose) of the sulphat or nitrate, and, using the same medicine dropper to insure uniformity in the size of the drops, inject the solution once a day, gradually increasing the dose by one or two drops until no further

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increase is tolerated. I then diminish the dose one drop ($\frac{1}{100}$ gr.) daily until no reaction is produced, and thenceforth continue that quantity. In conjunction with the injection I prescribe tonic doses of tinct. nucis vom. or liq. strychnia, combined or not with iron or quinin, before meals.

Iodid of potassium is another useful remedy and to be given, like strychnia, in gradually increasing doses. When there is hyperemia of the disc or signs of odema this drug is to be preferred to nux vomica preparations.

On account of the temporary improvement induced by inhalations of *amyl mitrite*, that drug has been recommended by several observers, Deutschmann especially, but although I have frequently tried it, I do not believe that it produces any permanently useful effects.

Coursserant (252), de Wecker and others advise hypodermic injections of pilocarpin in tobacco-alcohol amblyopia.

The tonic effects of electricity should not be forgotten, and I believe its use is attended with benefit in almost all cases of central amblyopia, although I know very little of its *modus operandi*. The interrupted galvanic current, in doses of from one to five milliamperes should be employed, the negative electrode to the eye and the positive to the nape of the neck, for a few minutes daily.

Potassic bromid was employed twenty years ago in the treatment of the amblyopia from alcohol, probably on account of its beneficial effect in other manifestations of alcoholism. See, for example, the papers of Bull (253), and L. Turnbull (254), the latter claiming priority over Quaglino (255) in the use of this remedy. The Italian ophthalmologist not only shows that he had used the bromid several months before Turnbull, but credits MacNamara and Galezowski with its recommendation at a still earlier date. He prescribed it in doses of 1 grm. to be gradually increased until as much as 8, 10 or 12 grms. daily are taken. The Italian medical journals from 1871 to 1880, and even later, contain enthusiastic references to the value of potassium bromid in amblyopia ex abusu. The papers of Fumigalli (256) and Simi (257) are of especial interest.

Quinia sulphat has also had its advocates, but it is not likely that it has a specific action, but produces its good effect indirectly, as a general tonic. Ponti (258) employed it in 1873 and claimed for it special advantages.

I have already spoken of the use of hypodermic injections of

pilocarpin in alcohol-tobacco amblyopia. Coursserant asserts that immediate relief (*vide ante*) is given, that the cure is rapid and in every way satisfactory. He considers it especially valuable for poor people, who need their eyesight sooner than their more affluent neighbors! He presents a list of twenty-three cases, all treated by this means, with the addition of abstinence, tonics, the use of tinted glasses and, sometimes, hydrotherapy. He claims that cures were made in from nine to forty-five days.

I have myself had some experience with pilocarpin injections in such instances and think highly of them. I believe that where one can have his patient under proper control, especially in a hospital, these injections, given daily, beginning with $^1/_8$ gr. and increasing the dose if necessary to produce marked salivation, are of signal advantage and do cut short the time of treatment. Of course the dose, the interval between the sub-cutaneous medications, as well as other details of treatment, must be varied to suit the individual case. As a rule I give them early in the morning with the following remedial adjuncts: the patient does not rise for breakfast, but takes instead of that meal copious drinks of hot and weak lemonade *after* the injection. He is then wrapped in blankets, with hot bottles to his feet and allowed to sweat thoroughly for half an hour. The hot bottles and all but one blanket are now removed for another half hour. Then he is rubbed down, allowed to dress and takes a light breakfast. In the afternoon, after lunch, he may go about as usual. I would strongly advise those who have not tried this plan to make the experiment in suitable cases.

Arsenic. According to Osler (259) peripheral multiple neuritis is occasionally a result of arsenical poisoning, the symptoms of which closely resemble those due to chronic alcoholism. The remarks made regarding the relation of these nerve changes in the case of alcohol probably also apply to the nervous lesions produced by arsenic. Having them in view one may regard the retinitis and its attendant vitreous disease, seen in Hutchinson's case (49), as an arsenical neuritis of the peripheral variety. Probably, also, the nystagmus observed by Krehl (123) was due to the same cause—a neuritis of the external ocular muscle supply —that Uhthoff assigned to this symptom in his case of alcohol amblyopia.

Aside from Liebrecht's case (50), Dana (121) and H. Derby (122) have abundantly proved the production of optic neuritis by this poison. The former thus concludes his elaborate researches: "1. A disease resembling tabes may be caused by arsenic taken

medicinally or otherwise. 2. The arsenical paralyses are due to a multiple neuritis. 3. Arsenical paralyses, like those of diphtheria, alcohol and lead, are of two types, (*a*) the ordinary mixed motor and sensory paralyses, and (*b*) the pseudo-tabetic form." In other words the optic neuritis due to arsenic is (or may be) part of a multiple neuritis or it may take on the retro-bulbar form or present the usual picture of an optic neuritis.

Carbon Disulphid. Where this agent is employed in conjunction with the *chlorid of sulphur* in vulcanizing, it is the former that occasions the retro-bulbar and simple optic neuritis, which are the characteristic ocular lesions of the intoxication. Decided changes are found at the papillary region. In the earlier stages these are haziness of the disc and other signs of a chronic papillitis, but later on pallor and atrophy appear. Central defects in the visual field are almost always found when sought for at the onset of the ocular symptoms. Indeed we may regard the early changes as almost invariably those of a retro-bulbar neuritis gradually deepening into a true simple atrophy, unless the patient is removed from the malign influence of the poison and promptly treated.

Becker (260) remarks that the oval scotomata in his case lay more above than below, as in alcohol-tobacco amblyopia, and believes the whole process to be probably a retro-bulbar neuritis affecting the macular fibers, the color sense being more disturbed than the form sense.

Treatment. Improvement begins as soon as the patient is removed from the influence of the poison. Many of the cases included in the report of the committee appointed by the Ophthalmological Society of the United Kingdom were treated by phosphorus. Recovery from most of the symptoms — the anaphrodisia and weakness of the legs being very intractable— occurred after several months. Hirschberg (261) treated his two patients with potassic iodid combined with a course of sweating. Becker gave the iodid with iron, and, later, *ext. nucis vom.* internally, followed by strychnia injections. Lavigerie (262) claims good results from the use of potassic iodid and strychnia. Gallemaerts' (115) case—a well marked example of retro-bulbar neuritis—was treated with quinin and strychnia and improved greatly.

Cocain. The acute cases call for powerful stimulants, especially amyl nitrite inhalations, ether injections and electricity.

Golowkow (263) reports the following case:

A patient, for toothache, was given two hypodermic injections (a Pravaz syringeful each time) of a two per cent solution of cocain muriat at an interval of ninety minutes. Five minutes afterwards there was noticed dilatation of pupil, extreme pallor, small pulse, rigors, and great difficulty of breathing. In ten minutes the pulse was 200 and dicrotic, respirations 60, pains in back and cardiac region, fear of death, convulsions of extremities. Inhalations of strong *liquor ammoniac* and its internal administration (4 to 5 drops every five minutes) caused in half an hour a decided diminution of the symptoms.

ERGOT. The permanent cataract as well as the temporary amblyopia are both probably due to the cutting off of the nutrient supply to the retinal vessels, to the optic nerve, and to the ciliary vessels supplying the lens. Knies thinks that the general convulsive seizures of ergotism may have something to do with the production of raphanic cataract just as it is probably the cause of lamellar cataract in rachitic children. This is also the opinion of Talko, who does not think it due to the action of the ergot. Meier (143) also believes that the ergotism acts through the medium of the ciliary nerves and that these in their turn bring about a contraction of the vessels, shutting off the nutritive supply to the lens.

IODOFORM. This is unquestionably a drug that like tobacco and alcohol produces a retro-bulbar neuritis, and although no autopsy was made in any of the cases reported, all the symptoms point to changes in the nerve closely resembling those found in other members of the same group. Priestly Smith gave his patient at first hypodermic injections of strychnia and, later on, the same remedy, combined with iron, by the mouth. Hutchinson's case was treated with hypodermic injections of strychnia (gr. $^1/_{10}$) daily. In a fourth case reported by Valude (264) the symptoms were such as might have followed the suppuration, diarrhea and hectic fever, that are sometimes set up by extensive burns. The patient was a boy, 12 years of age; the burn extended over the lower part of the right side of his body, and was at first treated with iodoform, and shortly afterward the patient became totally blind. Eleven months subsequently to that, V., R. = fingers at 10 cm.; V., L. = fingers at 20 cm. The discs became white and atrophic, color perception was lost, but the retinal vessels were not contracted.

LEAD. Unfortunately there are very few autopsies recorded. In Atkinson's case no changes in the ocular apparatus are mentioned. The various manifestations of lead amblyopia probably correspond with very different morbid alterations in the tissues of the eye. In

the mild forms, where there are no ophthalmoscopic appearances, one can but guess at the probable organic lesion. Gowers (265) thinks that the transient amblyopia is caused by the effect of lead on the nerve centers, as in uremia and diabetes. Gunsberg (129) who publishes a case of transitory amblyopia due to lead poisoning, would class it among the uremiæ. He considers that the kidney affection is caused by the plumbism, which in its turn brings about a temporary disturbance of vision. Weber (266) thinks that the amaurosis is not due to kidney disease, but is a brain symptom. He explains the temporary amblyopia by regarding it as the result of arterial spasm and the over filling of the veins—such a condition as is present in an attack of lead colic. These symptoms occur in a person but a short time exposed to the poison.

Long-standing cases of white atrophy, as well as those that show acute inflammatory neuritis (papillitis) with retinal hemorrhages are the result of nervous irritation set up by the circulation of lead salts in the system. So far as we know, the histological changes are those that accompany these diseases when due to other causes, such as diabetes, albuminuria and brain tumors. As we may have retinitis when no kidney disease is present, and optic atrophy without decided spinal or cerebral symptoms, it is not proper to regard the latter as only indirectly dependent upon the circulation of plumbic salts in the system. When two or more possible causes of the ocular affections co-exist in the same patient, their pathology is to that extent obscured. The local appearances of most examples of albuminuric and diabetic retinitis are, however, so pathognomononic and so different from the inflammatory fundus-changes seen in lead amblyopia that the question of causation does not often arise. The possible coincidence of brain tumor with lead amaurosis must also be borne in mind.

As the actual method of causation of any of these morbid states is still *sub judice*, it is idle to speculate about their origin in the comparatively rare instances furnished by lead poisoning.

Parisotti and Molotti (267) observed a case of optic nerve atrophy which after careful examination by the ophthalmoscope, they concluded was the result of an *endarteritis saturnina obliterans*. The ocular muscular pareses are undoubtedly the result (as in the paralysis of the forearm extensors) of a peripheral neuritis. The third nerve is affected in precisely the same way, although not so frequently, as the muscular branches of the musculo-spiral and posterior interosseous.

Many theories have been advanced respecting the essential structural changes in the various manifestations of chronic lead poisoning. Whatever secondary alterations may occur it is probable that the process *begins* (Oeller, Kussmaul, Meyer) in the terminal vessels as a fatty metamorphosis or arterio-sclerosis (obliterating peri or endarteritis). Later on, the nervous, muscular and other tissues supplied by these nutrient vessels may be converted into fat, fibrous tissue or the hyaline substance. As before mentioned, these changes, when they occur in the retina, may, during life, be studied ophthalmoscopically.

The following five cases reported by Landesberg (125) will serve to show the results of *treatment* in cases of lead amblyopia.

Case 1. Patient 40 years of age; worked fifteen years in plumber's shop. Had several times suffered from general attacks of lead poisoning. Atrophy of both papillæ. V., R. $= \frac{10}{200}$; V., L. = fingers at four feet. The treatment consisted of warm baths and hypodermic injections of strychnia, after which V., R. $= \frac{10}{100}$; L. unchanged.

Case 2. Lead worker 21 years of age, who handled chiefly lead oxide, besides general symptoms had paralysis of the rectus externus on R. side. Complete recovery.

Case 3. Lead worker, 34 years of age, had several attacks of general lead symptoms. R. E., complete paralysis of all branches of the oculo-motorius. Pupil slightly contracted and the accommodation normal. K. I. and diaphoretic treatment did no good, but strychnia subcutaneously brought about a complete cure.

Case 4. Lead worker, 39 years of age, had central atrophic excavation of both papillæ with great narrowing of the arteries; also commencing ataxia and interference with audition. V., R. $= \frac{20}{200}$; V., L. $= \frac{10}{200}$. Treatment did no good.

Case 5. Painter, 23 years of age, who had shortly before suffered from lead intoxication, Neuritis optica, both sides. V., R. $= \frac{20}{40}$; V., L. $= \frac{20}{40}$. K. I. with pilocarpin *sub cutem* brought about complete recovery and good vision.

Breuer (268) advises local blood letting, the artificial leech to the temples once a week, with subcutaneous injections of morphia into the temporal region.

Quinin. According to Knapp (91) the clinical features are pallor of the disc, marked diminution of retinal vessels in number and caliber, and contraction of the visual field. Buller (93) thought these symptoms to be the result of an effusion into the lymph spaces around the nerves, too transient to cause papil-

litis, but sufficient to produce edema and blanching of the retina, and to reduce the blood-carrying capacity of the central arteries. E. A. Browne (92) thinks that the nutrient fluids of the body, becoming charged with quinin (and acting through the vasomotor system) cause a contraction of the peripheral vessels and prevent the entrance of blood into the retinal arteries and veins.

Brunner (269) (and Horner) made experiments on dogs under the influence of large doses of quinin, and concludes that the disease is essentially a retinal ischemia. Ulrich (270) confirmed this finding in 1887. In the hope of being able to throw some further light upon this subject, de Schweinitz (90) produced quinin blindness in dogs by hypodermic injections—one to four grains to the pound. Ophthalmoscopic appearances before the death of the animals were much the same as that found in the human subject. Blindness was produced in from three to fourteen hours and lasted from thirty-six hours to twenty-nine days. The eyes were hardened in Mueller's fluid, cut in paraffine and stained with borax-carmine and indigo-carmine. Wiegert's staining was used for the detection of nerve changes. No gross lesion was found except in one case. Here there was decided dilatation of the blood vessels, the central vein was plugged with a clot and white thrombi filled the smaller veins. There were no alterations in the retina, and Wiegert's stain showed no nervous lesion. In every corneal section there was remarkable dilatation of the perivascular lymph spaces with degeneration of the cellular protoplasm. On the whole, de Schweinitz believes that while his experiments do not prove or disprove any of the hypotheses hitherto advanced, those who place the lesion in the optic nerve chiasma and eye-ball come nearest the truth, and that there is present in quinin amaurosis a species of temporary edema. That retinal thrombosis is not present in the human species is evidenced by the more or less rapid recovery from the disease.

The author made a second series of experiments (271) the result of which he reported to the twenty-seventh meeting of the American Ophthalmological Society. He found that the changes previously discovered can be produced by all of the various salts of quinin, and that prolongation of the quinin blindness results in a true optic atrophy sometimes associated with the production of thrombosis or embolism in the central retinal vessels. In sections made from a dog, kept completely blind for two months, the microscope showed cupping of the optic nerve entrance, complete atrophy of the optic nerve, chiasm and tracts, an organized

thrombus in the central vessels, and some degeneration of the lenticular ganglion. A very remarkable fact is the selection of the optic nerve for the influence of quinin, as careful sections of the ciliary and other cranial nerves showed absolutely normal structure.

The change in the pericellular lymph spaces, which had been found in the first research, was shown to be unconnected with any action of quinin, being purely an accidental occurrence, perhaps due to some fault in the technique. The conclusion from these experiments are: that the action of poisonous doses of quinin is undoubtedly originally due to a constriction of the peripheral vessels; that later, distinct changes, either in the blood itself or in the blood vessels, are originated, and that consequent thrombosis may occur, followed by complete atrophy and fatty degeneration of a large portion of the visual tract. These conclusions are in accord with those of Barabasheff (272) based on observation of the clinical symptoms produced by very large doses of quinin in human adults.[1]

The *treatment* of quinin amaurosis is much the same as that of tobacco amblyopia, but it, of course, must vary in accordance with the character of the fundus changes and is very unsatisfactory. Kaspar Pischl's case (273 and 101) (where the usual symptoms were present and the F. of V. for white was narrowed to three degrees) recovered under strychnia injected hypodermically so that the perimeter measurements for white were almost normal; field for colors somewhat restricted; discs still pale and vessels narrowed. Webster Fox (274) successfully treated his case—a boy, 13 years of age, whose vision after three months use of quinin, sank suddenly to $\frac{20}{200}$—with hydrobromic acid administered internally. In Peña's (275) report a 7-year old scrofulous boy had an ophthalmoplegia, loss of vision and the usual fundus changes from quinin. The treatment consisted at first, of cod liver oil, tonics and hypodermic injections of strychnia nitrate, followed, later, by the constant electric current. R. C. Prewitt (276) had a patient, boy, 5 years of

[1] A few months ago Dr. de Schweinitz wrote me, in answer to an inquiry, as follows: "I have not done anything very special in regard to the toxic amblyopias recently, but am gathering together some of my work on this topic for publication. I regret to say that my recent experiments in alcohol have been entirely negative, as I think I told you those in tobacco were, but neither of them was carried on to any great length. Those in Filix mas also turned out negatively, at least as far as I have gone. I have not examined all of my specimens as yet, and have hopes that perhaps some may show lesions."

age, who on the second day after taking four grains of quinin every two to four hours became perfectly blind. The drug was stopped, ergot and potassic bromid were administered and in a few days sight was restored. Berger (*loco cit.* p. 410) considers laudanum *plus* alcohol in large does, an antidote to quinin, and in a case reported by him (a woman, 22 years of age, blind and deaf after a single dose of 150 grains) gave these remedies, followed by strychnia hypodermically, with some improvement, although, as in a majority of such instances, the limited field and marked fundus changes persisted. Claiborne (277) has also lately added his (similar) experience of the treatment of quinin amaurosis.

Dr. de Gouvea, of Rio Janeiro, at the last meeting of the International Medical Congress, related an interesting case of quinin amaurosis (278), which he said was quite common in Brazil:

A strong farmer, 30 years of age, took 20 grms. of quinin sulphate with suicidal intent, and in spite of an emetic immediately administered, lost consciousness. On recovery he was blind and deaf. Eight months afterwards he had doubtful perception of light in both eyes, snow white papillæ and barely visible retinal vessels. Hearing improved. He was given amyl nitrite inhalations, cold douches, followed by rough towelling, and later strychnia injections in the temples. After a treatment for a month by these methods without result he was sent away with advice to continue the cold water cure. Eight months later he returned with V. of I in one eye and ⅔ in the other. The visual fields are concentrically contracted; there are no marked changes in the papillæ and the retinal vessels are somewhat more visible. Tinnitus still present.

Salicylic Acid and Sodic Salicylate. Knapp (135) states that in three cases the visual disturbances after these drugs are about the same as in less severe attacks ot quinin amaurosis and leave behind them no noticeable traces. The results of de Schweinitz's experiments on dogs (90) where large doses were given were entirely negative. He failed to discover anything that might lead one to suppose that the character of the lesions resembles those of quinin.

Some additional clinical evidence in favor of Knapp's suggestion regarding a similarity between the tissue alterations in the amaurosis of the salicylates and the milder forms of quinin amblyopia is furnished by such cases as Rogers' (Vol. III, p. 81 of these Annals) and the following experience of my own:

Dr. F., 23 years of age, consulted me August 13 last. His eyesight had had always been good until ten days before, when he found himself suddenly unable to read. This got worse during the following two or three days until he noticed failure of distant vision also and that his pupils

were widely dilated. He had not been taking mydriatics internally, had not used eye drops or any application to the eyes. No sore throat for months. For rheumatism, attacks of which he has occasionally, he has been in the habit of using powders of sodic salicylate. Lately he had taken in all nine or ten gramme doses, and after the last dose became quite deaf, with vertigo, buzzing noises in the ears and throbbing in the head. Last of all the ocular signs appeared. The tinnitis and other aural symptoms left, but the eye difficulties persisted. On the first day that I saw him, ten days after the eye symptoms set in, V., R. $= \frac{8}{15}$ and J. VI at 30 cm.; V., L. $= \frac{9}{10}$ and J. VIII at 30 cm. Pupils dilated, but respond sluggishly to bright light and to efforts at accommodation. With + 2 D. left, and + 1.75 right, patient can read J. I at 30 cm. There were no visible fundus changes. Under $^1/_{10}\%$ eserin ointment, patient slowly recovered normal vision for both distant and near work.

PTOMAINES. One of the active agents in fish poisoning, and, indeed, in several other forms of decomposed food that produced *mydriasis*, was found by Brieger to be *ethylenediamine*. It is a strongly alkalin base, readily forming neutral salts with acids.

Treatment is practically the same as for atropin amblyopia.

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[THE END]

ACOUSTIC NEURASTHENIA.

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NEURASTHENIA may be defined as a played-out state of the nervous system and acoustic neurasthenia as one manifestation implicating the acoustic nerve. Acoustic neurasthenia marks the first approach of this insidious symptom-complex upon the domain of the special senses. Either one or both ears may be involved. Patients so affected complain principally of a hardness of hearing, varying from the more common disorder of mere slowness of hearing to so great an impairment that the whisper is heard only close to the diseased ear. In the former, the sounds are heard but because of acoustic lassitude are not quickly combined, and the patients will often answer a question some moments after all hope of a response has disappeared. One is apt to become impatient with them, there is such an apparent dullness of cerebration. How far this is due to cerebral and how far to acoustic inertia, the writer is not prepared to state. This slowness or hardness of hearing has existed for an interval varying from a few days to as many years, according to the duration of the causative conditions and the individual resistance. Tinnitus may or may not be present, nearly as often the one as the other, and when present may be either occasional or constant, the latter being regarded as especially tantalizing, so much so, indeed, as often to be the main grievance. Pain is an occasional symptom, and is either of the sharp and shooting, or of the dull, aching variety, and is never constant. Paresthesiæ are apt to be very common, and are complained of more at certain times than at others. The membrana tympani and tympanum may be normal or may show signs of any pre-existing or existing diseased condition, for it is true of neurasthenia that it explodes in a part already weakened by pathological processes, and, like cerumen, often coexists in the ear with other aural trouble. It is tempting to write down a case, cerumen, and dismiss it from one's memory, but it is not truthful, and so it is with neurasthenia. The rhino-pharyngeal tract may be normal, atrophic or hypertrophic and its processes seem to have no especial bearing upon the progress of the disease.

The general health is in some cases surprisingly good, the muscular system well developed and the other special senses well preserved. Still, in the majority of neurasthenics, the stomachic and intestinal digestions are prone to derangement, though it is not rare to find the bowels regular and the digestion good, especially among the more youthful patients. Many are delicate and ill-kept. They are usually of a nervous temperament, which in the more serious cases becomes hysterical.

In testing the hearing and in making the diagnosis, the tuning-forks and Galton whistle render valuable aid. A few typical cases are appended, with their tuning-fork reactions, by way of illustration. A *schema* showing the normal reactions is first given, the numerals representing the duration of perception in seconds, the Rinné showing whether the respective forks are heard louder by A C or B C (air conduction or bone conduction) at the initial point.

Rinné		A C	A C	A C	A C	A C
Schwabach	A C	24⅔	14⅔	33	31⅔	22
	B C	13	7⅓	12⅔	13⅓	14
T.-F.		C 128 v. s.	C^{1} 256 v. s.	C^{2} 512 v. s.	C^{3} 1,024 v. s.	C^{4} 2,048 v. s.

Case I. E. D., 18 years of age, general health poor, troubled with acne, rather dull and sullen, masturbates three or more times daily; complains of deafness lasting six months, with constant tinnitus; good appetite, sleeps well; membrana tympani moderately succulent and retracted, light reflex shortened; naso-pharynx normal; watch heard 1 P., whisper zero, speech 1 ft. Tuning-forks as follows:

Rinné		A C	A C	A C	A C	A C	A C
Schwabach	A C	6	9	5	7	8	5
	B C	4	6	4	6	4	8
T.-F.		C-^{1}	C	C^{1}	C^{2}	C^{3}	C^{4}

Case II. J. A. D., 21 years of age, complains of slowness of hearing; membrana tympani about normal; no tinnitus; an athlete with a worrying

business; extremely good physique and health, but nervous; watch heard 30″, whisper 22 ft.. Galton whistle $\frac{9}{16}$, Weber =. Tuning-fork average for both ears:

Rinné		A C	A C	A C	A C	A C	A C
Schwabach	A C	10	16	16	17	16	14
	B C	4	7	2	4	5	3
T.-F.		C–1	C	C1	C2	C3	C4

Case III. A. K., 29 years of age, deafness for eight months; confined six months ago; membrana tympani moderately retracted, light reflex shortened; watch zero, whisper zero, speech 8″. Tuning-forks:

Rinné		A C	A C	A C	A C	A C
Schwabach	A C	16	13	8	7	7
	B C	10	9	0	0	0
T.-F.		C	C1	C2	C3	C4

One more case is given as being typical of those cases of neurasthenia engrafted upon a previously existing middle-ear affection.

Case IV. D. W., 15 years of age, has been over-studying and at the same time undergoing a series of operations upon the throat, complains of hardness of hearing in one ear for three years, much worse lately; no tinnitus; has "catarrh"; scarlet fever with slight discharge one year before; quite hysterical; watch heard zero, whisper 20 ft., Galton $1\frac{7}{16}$. Tuning forks:

Rinné		B C	B C	B C	B C	=	=
Schwabach	A C	0	0	0	8	18	14
	B C	7	11	6	8	10	13
T.-F.		C–1	C	C1	C2	C3	C4

Two visits were required to complete the examination, her hearing power becoming almost *nil* to the forks after a few moments use. The pre-existing middle-ear trouble had been much aggravated by the strain upon her nervous system of the anticipation of the various operations and of scholastic examinations.

In these cases the duration by B. C. was reduced throughout as compared to the normal; the upper tone limit was little, if any, impaired (by Galton) in many, above 2 on the scale being practically normal. The duration by B. C. was quickly lessened, for any fork, if another had just previously been used, thus indicating extreme nervous debility. The testing was ill-borne, and burdensome. Under treatment directed to the middle ear very little improvement was attained, but by means of rest and tonics, hearing was improved, as was also the duration of the tuning-forks, by both A. C. and B. C., the latter often to twice its former duration in time.

Etiologically, over-work, especially of the brain, is of the most importance; either along one line, as in teaching, or along too many lines, as, for instance, with the young business man who indulges a craving for athletics and social life. In recent years, the influenza has frequently left the nervous apparatus unstrung. Pregnancy, with its attendant ills, is one cause that is apt to injure profoundly the acoustic nervous apparatus, and when repeated often impairs the hearing more and more. Masturbation, that cause-all for indefinable nerve manifestations, here crops up its hydra-head; with reason, however, as all sexual excesses, especially the perverted, are disposed quickly to damage the eye and ear. These various causes, with others unmentioned, probably influence a disturbance in vaso-motor control. so that either a state of hyperemia or anemia is induced in the labyrinth or at the auditory center, which continuing for a certain length of time, produces the typical symptoms. It is probable, that in a well-balanced person, these causes would provoke but little response, but in those inclined to nerve derangements they are sufficient to create effects. The finger can not be placed upon any definite pathological changes as existing in any structure, either because there are none (Gray) or because they have not as yet been discovered.

The treatment is that of general neurasthenia; rest, tonics, and, as so ably emphasized by Gray, fresh air more than exercise. The more air and rest the better. Exercise is to be indulged in with great caution and under competent supervision. The use of drugs is deprecated by many, but the writer has certainly seemed to gather benefit from the judicious exhibition of strychnia, either alone or in combination with the bromid of potassium.

The prognosis is good where the treatment is conscientiously carried out; relapses, however, are by no means uncommon.

147 Remsen street, Brooklyn.

ANNALS OF OPHTHALMOLOGY AND OTOLOGY

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CLINICAL MEMORANDA.

EAR FAINTS AND EPILEPSY.

BY C. M. HOBBY, M. D.,
OF IOWA CITY, IA.

EVERY one treating diseases of the ear has probably noticed the frequency with which ear patients faint; they faint when the ear is syringed, when it is wiped with cotton, when any operation is performed upon the membrane, and with so little reference to the amount of pain suffered that it would seem that there must exist some physiological reason why syncope should occur so often in ear cases, while it so seldom happens in eye cases. There are, moreover, peculiarities in the fainting of ear patients, which seem to have escaped the attention of writers upon the subject: peculiarities which often distinguish the loss of consciousness in ear cases from ordinary syncope, and which have suggested to the writer the relationship of such cases to the minor forms of epilepsy.

In ordinary syncope there is usually more or less of anticipatory phenomena, such as pallor, sighing, etc., which suggest the

approaching faint in time for the watchful surgeon to arrest the process; but in the peculiar form referred to, the patient, without warning, slides down in the chair, the eyes roll up, unconsciousness supervenes without pallor, a slight stiffening of the body follows, sometimes preceded by one or two slight contractions of the extremities, sometimes there is grating of the teeth, then a gentle sigh, a look of surprise and the attack is past.

The absence of pallor, of dilated pupils, of nausea before and after; the presence of contractions, the rigidity, and the rapid recovery, mark the distinction between such an occurrence and ordinary syncope. In the writer's experience, one-half of the ear cases which have lost consciousness during treatment have presented symptoms that indicated that the loss of consciousness was of an epileptic character.

PRISMS.

By C. M. Hobby, M. D.,
of Iowa City, Ia.

WITHOUT considering the value of prisms in the treatment of muscular anomalies and incoördinations, it is apparent that an erroneous theory of the action of prisms is prevalent, which often leads to disappointment in practice, but oftener to a lack of appreciation of the value of muscle training in treatment of apparent insufficiencies of the ocular muscles.

This theory is to the effect that prisms aid in the exercise of the ocular muscles as dumb-bells aid the exercise and development of the muscles of the chest, arm and back. A little consideration shows that this proposition is unfounded, the dumb-bell resists muscular contraction, and makes it necessary for the muscle to put forth increased strength, but in no manner interferes with coördination; the prism, on the other hand, interferes directly with coördination, but in no case adds anything to the resistance, or to effort required, and therefore cannot aid in the development of muscular strength. In disciplining or training the co-ordinative impulse prisms may be of assistance, but the writer believes that the same attention to effort, and the same repetitions of movement, would accomplish the same results without the prism.

IMMEDIATE CAPSULOTOMY FOLLOWING THE REMOVAL OF CATARACT.

By Geo. F. Keiper, A. M., M. D.,
OF LAFAYETTE, IND.

EYE AND EAR SURGEON TO ST. ELIZABETH HOSPITAL.

THE above is the title of a paper by Dr. L. Webster Fox, which appeared June 2, 1894, in the *Journal of the American Medical Association*. This operation has become a favorite with me, and because of a slight difference in the use of instruments I will relate a case.

March 12, 1894, Mrs. E. C., 74 years of age, was brought to my office for examination of her blind eyes. Cataract was discovered to be the cause. Operation upon the right eye was advised and the advice accepted. March 17, at St. Elizabeth Hospital, the extraction of the lens was attempted. The usual procedures were gone through with plus iridectomy because of a sluggish iris. Close inspection revealed opaque posterior capsule. Feeling that under any circumstances she could be no worse than she was, I introduced Dr. Eugene Smith's modification of Knapp's capsule forceps and seizing the capsule tore it open forcibly. The loss of vitreous was insignificant. Her recovery was uneventful. June 7th we adjusted a + 10.00 D. lens and secured vision of $\frac{20}{60}$.

Dr. Fox recommends a gold enameled hook. I believe the capsule forceps will be found easier of manipulation.

A CASE OF VASO-MOTOR RHINITIS.

By Howard S. Straight, M. D.,
OF CLEVELAND, OHIO.

LECTURER ON DISEASES OF THE THROAT, NOSE AND EAR IN THE WESTERN RESERVE UNIVERSITY.

IN April, 1893, a man, 35 years of age, in perfect health, came to consult me as to a nasal trouble from which he had suffered for the last two years and a half. Before that time he had had no trouble with his nose. His first attack occurred in Augnst, while he was working at the electrical outfit of a street railroad motor. His friends told him he had hay fever. For a few weeks he put himself under the care of a very able physician, who gave him sprays of oil, cocain, etc. From this treat-

ment he received no benefit, and he consulted another physician, who cauterized the turbinated bodies with chromic acid. For a few weeks he thought he was benefitted, but at the end of six weeks he was as bad as ever. For a year after this time he took patent medicines for a time, but finally abandoned everything. About eight months before coming under my observation he consulted a third physician, who repeated the chromic acid applications. The use of the chromic acid the second time did not afford even temporary relief. For the next few months there was no change in his condition. He complained of periodical sneezing, excessive discharge from the nose, stuffiness, lacrimation, etc. His symptoms during an attack were those of ordinary hay fever. He never had any asthma, nor had he at the time of the attack any constitutional symptoms. The attack would come on suddenly without any warning, and would last from one day and a half to two days. He was more liable to an attack during wet weather, but they occurred winter and summer about every two weeks. During the interval he had no trouble with his nose. The sneezing was worst mornings on rising. He said that he would sneeze possibly 200 times during the day. The discharge from the nose was so great that he used to keep four or five handkerchiefs in his room, and would wash them out when saturated and then dry them on the radiator. His work was largely inside, as he was the electrician of a large business block. At meal time the discharge would drop into his plate unless he was careful. He had no headache more than the feeling of frontal fullness. He made his first visit to me during the time of freedom from attack.

An examination of his nose revealed narrow nasal passage, but no abnormal contraction. There was no deviation of septum, no hypertrophies, no sensative areas, and nothing that seemed to me to require any local interference. He had no disturbance of any other portion of the upper air tract. He was informed that the condition of the nose was normal; that the chromic acid cauterizations had reduced any hypertrophies that might have been present; that he had already had local treatment enough, and that some soothing application seemed to me the only treatment indicated. An alkaline wash was first suggested. Then a menthol and albolene spray. His reply was that he had already used everything suggested without any benefit. I refused to do anything locally because I saw no condition requiring local treatment, and he went away without being willing to make another trial of alkaline washes, etc. After a few days he returned in the midst of an attack. He was suffering very great discomfort and he begged me to do something for him. I confess I did not know what to do, he had already tried everything that seemed to me to offer any hope of relief. This attack, like all the others, came to an end. He returned, and I again went over the case carefully. I could find no reason for any change of opinion. For three months he continued his visits. He would come about once a week. The refusal to treat locally was persisted in because no reason appeared for change of opinion. The more I saw of the case the more I became convinced that the fault was more due to a nervous disturbance than that it was inflammatory in its nature. The idea of a very superficial cauterization with the galvano-cautery in the hope of producing a sedative effect upon the end nerves occurred to me from reading the chapter on Hay Fever in Dr. Carl Seiler's

"Diseases of the Throat." There was no thickened tissue. The cauterization was therefore made as superficial as possible. I took a large, flat burner and cauterized a portion of the mucous membrane of the lower turbinated. The cautery was applied in this way twice on each side to the anterior half of the lower turbinated only. The septum and middle turbinateds were not treated. He pronounced himself better after the first treatment and wanted me to hurry up and treat the other side. After the slight reaction from the cauterization passed away he had no trouble at all for three months. Since last December he has occasionally felt a slight discomfort in the nose, and has sneezed a little for a few hours during wet weather. There has been no return of the discharge. He says that he is nine-tenths relieved of his trouble.

Comments on the case seem to me to be unnecessary. The case has been one of great value to the writer. This report has been withheld for months to be certain that the result thus far obtained is a permanent one. Whether the condition in which I found him might not return if he became depressed from overwork, worry, etc., is an open question. If he had taken constitutional treatment the possibility of recurrence would be more worthy of consideration. He complained most of the discharge and sneezing. The sneezing was the most troublesome, for he would sneeze until he was nearly "torn asunder." The cauterizations were entirely confined to the respiratory part of the nasal passages, and yet the beneficial effect upon the olfactory area seemed as pronounced as in the area to which treatment was directed.

185 Euclid avenue.

ABSTRACTS FROM FOREIGN OPHTHALMIC JOURNALS.

By Casey A. Wood, C. M., M. D.,
of Chicago.

THE SURGICAL TREATMENT OF TRACHOMA. TREATMENT OF THE NOSE AND NASO-PHARYNX IN OCULAR DISEASES. THE RELATION OF POST-NASAL ADENOIDS TO SPRING CATARRH. THE ORGANISMS THAT INHABIT THE HEALTHY AND THE DISEASED CONJUNCTIVAL SAC. TEARS AS A GERMICIDE. MECHANICAL CLEANSING OF THE SAC BEFORE OPERATIONS ON THE EYE. THE THERAPEUTIC VALUE OF OINTMENTS IN EYE DISEASES.

Dr. Venneman[1] has tried all the operative methods employed in treating granular lids and they have *all*, in his hands, been productive of good results, and every one—expression of the granulations, excision of the cul de sac, scraping, curetting, the use of the hard brush on the everted mucosa, with and without previous scarification—has been *equally* successful.

With this experience he is inclined to believe, as Panas does, that every operation on the lids, attended by loss of blood, is of value in the treatment of granular ophthalmia. The hemorrhage acts by depletion of the local blood vessels and lessens the activity of the inflammatory processes in the acute and subacute forms of trachoma. In the chronic variety the benefit obtained also springs from the destruction of the nutrient vessels.

Moreover, in simple canthotomy and canthoplasty one cuts off a portion of the vascular supply to the lids, just as in excision of the superior cul de sac a great many arterioles furnished to the palpebral conjunctiva are divided. So it is in "grattage," curetting

[1] E. Venneman. Le traitement chirurgical des granulations. *Archives d'ophtalmologie*, Juillet, 1894, p. 413.

and the use of the hard brush; there is indirect destruction of the conjunctival capillaries themselves.

Partisans of one or other of these various surgical methods of treating trachomatous lids appear to be working along the same lines. They desire, while removing or destroying the granular tissue, to leave intact the healthy conjunctiva. But Venneman believes, as the result of several years study of the subject, that it is a great mistake to suppose it possible to be able to destroy the granulations without injury to the mucous membrane of which they form a part. Indeed, the trachomatous granule is a transformed lymphatic corpuscle, *i. e.*, is not a separate new formation, but is the conjunctiva itself unequally hypertrophied and transformed into conjunctival embryonic tissue. The lymph corpuscle is a body absolutely innocent of all the damage done by the disease to the conjunctiva, and, by extension, to the globe itself. This lymphatic follicle is merely an accidental element in trachoma; it may disappear without leaving any trace and certainly never gives rise to cicatricial tissue. It is only in the large granulations, also, that one finds those bodies which have been called the "corpuscles of Flemming."

The number of normal lymph corpuscles in the diseased conjunctiva is very variable. The chief thing to be borne in mind is that whatever removes the embryonic tissue, constituting with the trachoma bacillus the disease called granular lids, kills off so much healthy conjunctiva.

The author prefers a combined method of treatment and practices a superficial removal of epithelium by Desmarre's scarifier, combined with sublimate irrigation of 1:500 solution.

On each of the following three days the conjunctiva is rubbed with tampons of cotton wool saturated with the same solution.

Cocain is needed only for the scarifying; there is usually no pain or reaction, but if any occurs cold compresses are to be applied. This is to be repeated daily if necessary.

The results are most beneficial. After two or three days a false membrane forms over the conjunctiva which, when rubbed off by the tampon, does not bleed. The author also regards the appearance of the false membrane as a good sign and thinks that it indicates an early recovery from the disease. He ascribes the good results of this combined treatment to the direct action of the corrosive sublimate on the microbes and their morbid products.

Relapses are less likely to occur if the patient's general health and surroundings receive attention.

TREATMENT OF THE NOSE AND NASO-PHARYNX IN OCULAR DISEASES.

Guibert[1] reviews very shortly the literature which he says is not voluminous. He insists that the coincidence of many ocular and nasal affections is not merely accidental, but that when present infection of the eye has generally followed the disease of the nose. He found, for example, in a young man from whose nose he had extracted ten polypi a paresis of accommodation and a slight degree of asthenopia. He finds the commonest ocular symptoms, that result from disease of the pituitary membrane, to be lachrymation (simple or associated with dacryocystits), inflammation of the nasal and lachrymal canals (due to ascending disease of their mucous lining). Relief of the eye symptoms is always assisted by cure of the nasal trouble.

Empyema of the frontal, maxillary and sphenoidal sinuses frequently affects the visual apparatus, most often causing neuralgia and asthenopia, the operation of which cannot be explained, unless they result from compression or paralysis of the nerve supply.

A friend of the author had an intense neuralgic pain in the left eye, made worse by pressure on the supraorbital nerve. The left upper lid was slightly swollen, but the eye itself appeared normal, both externally and internally. For several days the patient had a serious coryza, the secretion being more abundant on the left side, and this was associated with tenderness on percussing over the left frontal sinus, a symptom absent on the right side. This frontal sinusitis was duly treated and in four days the eye troubles entirely ceased.

The writer also refers to those cases, for some years past abundantly reported in our medical journals, where the cauterization of a hypertrophied spongy bone, or the removal of a polypus, has cured obstinate cases of asthenopia.

Although not so frequently mentioned, yet of frequent occurence and of vast importance, is the dependance of ocular diseases upon the presence of adenoid vegetations in the naso-pharynx. Guibert thinks these are very common, especially in strumous children. He has often seen inveterate forms of spring catarrh, kerato-conjunctivitis, strumous ulcers of the cornea, photophobia and various forms of conjunctivitis simplex promptly cured by the removal of these post nasal growths. Indeed, in many cases the

[1] Du traitement rhino-pharyngien dans les affections oculaires. *Recueil d'ophtalmologie*, Juillet, 1894, p. 391.

improvement began the next day after the operation, and both parents and surgeon were able to witness a decrease in the ocular congestion and other eye symptoms.

The exact manner in which diseases affect the eye from the nares through the nerve supply, the blood vessels, the lymphatic system or by contiguity of mucous tissue, is of less importance than the clinical fact that treatment should include antisepsis of the nasal passages, by douches, gargles, insufflation of powders, and the use of other remedies—such as operations on the nose and pharynx (cauterization, removal of polypi, adenoid growths, etc.) when these are indicated.

THE MICROBES FOUND IN HEALTY AND DISEASED CONJUNCTIVAL SACS.

Bach,[1] in the course of a very extensive clinical and experimental study of the organisms found in both the healthy and diseased conjunctival sac, asks and answers these questions: (1) Is the conjunctiva, when apparently normal, always to be regarded as infected? (2) What part do its secretions, normal and pathological, take in the diminution and increase of bacteria? (3) Is it possible by artificial means, to render an infected sac sterile? (4) If so, what method is most likely to attain this end?

The writer claims that, in common with other observers, he has found bacteria in the great majority of cases where the sac appeared to be entirely normal and that, consequently, it is safe to assume that *every* conjunctiva is infected with germs. Of the inhabitants of this locality he has discovered no less than ten micrococci that liquidize gelatin, and eight others that do not effect it. Of the bacilli liquidizing gelatin there were four; of those that did not effect it, one. These bacilli were none of them pathological and four were first found in the sac by the author. The rose fungus, two hyphomycetes (threads short and long; sometimes spirilla-like), mould fungi and two unknown bacteria were also discovered.

Of these twenty-seven organisms Bach gives the following description of ten pathological examples, in which we are most interested.

The pathogenesis of the various bacteria was determined by carefully removing the epithelium from minute spots in a

[1] Ueber den Keimgehalt des Bindehautsackes dessen natürliche und kunstliche Beeinflüssung sowie über der antiseptischen Wertn der Augensalben. *Graefe's Archiv. für Ophthalmologie*, Vol. XL, 3, p. 131.

disinfected rabbit's cornea and implanting therein the isolated organism. Control experiments were also made.

1. *Micrococcus albus liquefaciens of Besser.* Found in the nares, and twice, by author, in the conjunctival sac. *Pathogenesis;* in the immediate neighborhood of the corneal infection a slight gray infiltration, which disappeared in about four days. Moderate amount of pericorneal injection, which lasted but a short time. No iritis.

2. *Micrococcus pyogenes aureus*, found frequently in the sac. Extremely pathogenic and destructive.

3. *Micrococcus pyogenes albus.* A frequently found and actively morbific organism.

4. *Micrococcus flavus liquefaciens.* Described by Flügge as a bacterium whose habitat is wind and water. First discovered in the sac by writer. In rabbits produces corneal ulcer and well marked muco-purulent secretion.

5. *Diplococcus citreus conglomeratus.* Found in blennorrhoic discharges and in aerial dust. After twenty-four hours a well defined gray infiltration of inoculated point, which disappeared in three days. Pericorneal injection, but no iritis or hypopyon.

6. *Micrococcus aurantiacus.* Described by Cohn as a wate bacterium, but twice found by author in the conjunctival sac. Produces a gray infiltration (about the point of corneal infection) which does not long persist.

7. *Staphylococcus cereus flavus.* (Passet.) Found once by author. A rare pyogenic coccus. Twenty-four hours after inoculation, corneal ulcer with iritis and sometimes hypopyon.

8. *Micrococcus coryzæ.* Discovered by Hajek in the serous discharge of acute rhinitis and found by author in the sac. Infiltration of infected corneal puncture, with pericorneal injection and iritis but no hypopyon.

9. *Streptococcus pyogenes.* Sets up at once a rapidly spreading ulcer with iritis and hypopyon.

10. One unknown bacterium, resembling the *micrococcus candidus* of Cohn. The writer frequently found this in the sero-pus of acute conjunctivitis, and once in the mucous discharge from the conjunctiva in a case of xerosis conjunctivæ, and dubs it *micrococcus conjunctivitidis minutissimus.*

After introducing into the conjunctival sac certain germs, from which that region and the nose were shown to be free, Bach concludes that the infection stream is *from* the sac, through the nasal duct into the nose and practically never in an opposite

direction. As long as there was an unobstructed passage, colonies planted in the nose did not pass thence into the sac, although they readily traveled in an opposite direction. Even in the presence of a purulent dacryocystitis bacteria from the secretions did not injure the conjunctiva as long as there was even a partial drainage into the nasal passages.

TEARS AS A GERMICIDE.

To settle the question as to whether tears possess germicidal properties or whether they weaken the morbid action (as most experimenters have found that they do) by simply washing away their colonies the writer made some thirty-seven experiments with various pathogenic bacteria. In sixteen of these, where the bacteria were exposed for an hour to tears warmed to 58°—70° Celsius, the colonies greatly decreased in ten; in six there was a diminution less marked. In nineteen, where the tears were kept at ordinary temperatures, only four showed an increase in the bacteria exposed to the action of the lachrymal fluid.

Similar experiments were made with the soluble compounds (singly and combined) found in normal tears, with distilled water, with well water and with other simple liquids. *In nearly every case the pathogenic bacteria exposed to them decreased in number and shortly died.*

Further observations of ocular bacteria, exposed to the action of aqueous humor from human subjects, show that the former does not exert any germicidal action worth speaking of.

In the same way, it was shown that the staphylococcus pyogenes aureus, as the ideal pathogenic organism, flourishes kindly in a soil of vitreous humor.

Before operations upon the eye the author is strongly in favor of washing out (and so mechanically cleansing) the palpebral edges and conjunctival sacs with the physiological solution of common salt, in imitation of nature's cleansing process — the overflow of tears. He believes that this should, at any rate, always be carried out as an adjunct to such germicidal applications as sublimate, chlorin water, mercuric trichlorid, etc. Franke's statistics, where of 130 cases only 24 per cent showed a diminution in the number of bacteria after careful application of these antiseptics, are adduced as evidence of the inefficiency of germicidal solutions. The author places great stress upon mechanical removal of the germs by thorough irrigation and cleansing (with damp cotton) of all parts of the external eye, and asserts, as an

outcome of such observation, that better results are obtainable by the use of indifferent solutions, applied for their mechanical effects, than from antiseptics employed on account of their germicidal qualities. His experiments in this direction are interesting.

In thirty-nine cases (thirty-five lid margins, forty-two sacs) of infectious disease of the anterior portions of the eye he carefully disinfected the lids and sacs after the most approved style of the antiseptic school, and then counted the bacteria developed in sterilized agar after it had been infected with a platinum spatula previously rubbed over the cilia, lids and conjunctivæ. Shortly afterwards he irrigated and cleansed the parts with the salt solution and compared the results with the former. He found, after the use of the salt solution (1) that the number of organisms inhabiting the lids was sensibly diminished in 42 per cent of the cases; the sac, 30 per cent. (2) The palbebral edges were rendered sterile in 50 per cent; sac, 40 per cent. (3) Failure to effect any change, lids once; sac, three times.

THE DISINFECTANT ACTION OF EYE SALVES.

As a result of experiments with them Weeks has not much faith in the germicidal action of the ordinary eye ointments, but Bach, while admitting the uselessness of even a 10 per cent iodoform ointment, concludes, after many bacteriological observations, that *pure American vaselin is a valuable bactericide*, and should, when possible, be employed as a vehicle for remedies. Experiments with sublimate salves, 1:3000, and silver nitrate, 2 per cent, showed that myriads of cocci, collected on a platinum spatula, were killed in a few minutes by immersion in them. Yellow ointment, 1 per cent, was not so lethal, while boric acid, 3 per cent, had little or no effect. Bach also made a number of experiments with the surface layer of the boxes of ointments in everyday use in the Würzburg Eye Klinik (including the above named salves and a $^1/_2$ per cent mixture of lead acetate) and did not discover, in a single instance, the presence of bacteria.

Finally, the author believes that by the use of sublimate vaselin for twenty-four hours the sac and lids may be sterilized in all cases where the colonies are not too numerous and where one has not to deal with a too abundant supply of the staphylococcus pyogenes aureus.

[I have long believed and acted upon the belief that in cases requiring the application of remedies to the cornea, conjunctival

sac and lid margins the best results are obtained by their exhibition in the form of ointment and not as collyria. Moreover, the effect of such applications is greatly increased by applying them, on a probe, to the everted lids and then gently rubbing them over the eyeball (massage) for two or three minutes. As an example of this, citrine ointment, made with cod liver oil instead of the official neatsfoot oil, forms a smooth, stable, semi-liquid ointment of a dark brown color (which may be diluted to any strength by the further addition of cod liver oil) that lends itself to bulbar massage with admirable effect. So do yellow ointment, rendered partially fluid with albolene, *unguent hydrarg*, diluted with cosmolin, and many others. C. A. W.]

REPORT ON PROGRESS—OPHTHALMOLOGY

REVIEW OF CURRENT AMERICAN AND ENGLISH OPHTHALMIC LITERATURE.

By Charles H. May, M. D.,
of New York.

RECENT EXPERIENCE IN THE TREATMENT OF DETACHMENT OF THE RETINA, WITH A DETAILED REPORT OF THIRTY-EIGHT CASES.

Charles Stedman Bull, M. D., New York, (*New York Medical Journal*, September 1, 1894). Of the thirty-eight cases reported upon, thirty occurred spontaneously and eight as the result of traumatism. All cases were subjected to the following treatment: Rest in bed on back; atropin in one or both eyes; bandage to affected eye. This treatment was kept up for a period of from three to eight weeks. Pilocarpin hydrochlorate was injected hypodermically in twenty-five cases; commencing with a minute daily dose, it was increased to toleration. "In a number of these cases the drug produced such unpleasant or alarming symptoms that it was necessary to discontinue it. My experience has taught me that it should not be prescribed in persons suffering from functional or organic heart disease." When pilocarpin was not

well borne or contraindicated, small doses of bicarbonate of sodium and potassium iodid, largely diluted, to induce free action of the kidneys and bowels were given. Corrosive sublimate in small doses was given in cases complicated by iritis and choroiditis and in cases of extensive opacities of the vitreous. Puncture of sclera into subretinal space, subconjunctively, in nineteen cases; division of membranous bands at the vitreous end of the detached retina, in seven cases.

As regards the results of this treatment: There was temporary improvement in vision and in extent of the detachment, varying from a few weeks to several years, before the vision became reduced and the detachment increased, in twenty-three cases; no improvement whatever in eleven cases; apparent permanent cure, with entire disappearance of the detachment and restoration of useful vision in four cases. "There was little or no reaction following puncture of the eyeball through the sclera, or after division of the detached retina and the membranous bands in the vitreous, in any of the cases."

Dr. Bull believes the following conclusions justified by the results of the treatment of these cases:

1. The science and practice of ophthalmology have as yet discovered no better means of dealing with detachment of the retina than the old methods which have been advised and carried out for so many years, *viz.*, rest on the back in bed, atropin, a bandage, and the internal administration of some drug which may induce absorption of the subretinal fluid.

2. The continued use of pilocarpin, either hypodermatically or by the mouth, may cause great prostration, even in cases in which it is apparently well borne; and the desired effect may sometimes be produced by small doses of bicarbonate of sodium and iodid of potassium largely diluted with water.

3. In all recent cases, puncture of the sclera subconjunctivally may do good temporarily by letting out the subretinal fluid and allowing the retina to collapse, thus producing some improvement in the vision; but the apparent improvement is generally transient, and when membranous bands exist in the vitreous no improvement can be expected from simple puncture.

4. Division of fixed membranous opacities in the vitreous causes but little reaction, and may do positive good without division of the detached retina, as it reduces the danger of extension of the detachment. It is positively contraindicated in cases where the vitreous opacity is vascularized, as it would certainly induce free

hemorrhage into the vitreous. It should never be done in an irritated or inflamed eye.

5. Division of the detached retina, which allows the subretinal fluid to escape into the vitreous, may always be done in a quiet eye, and causes little or no reaction. If membranous bands are present in the vitreous, these should also be divided at the same time.

6. In most cases all these operative procedures produce but temporary improvement, and in many cases no effect whatever is gained by them.

7. There seems no good reason for any further indorsement of the method advocated by Schöler, but every reason for rejecting it from the domain of ophthalmic surgery.

THE SHADY SIDE OF THE SURGICAL TREATMENT OF TRACHOMA.

H. Clifford, M. D., Omaha, Neb., (*Medical Record*, August 25, 1894). The writer calls attention to the fact that although the surgical treatment of trachoma gives better results than the treatment with local applications of any kind of medicines alone, the disadvantages and dangers of the treatment have been little dwelt upon. Nearly one-fourth of his patients come to him for trachoma and he has been subjecting their lids to the most rigorous kind of surgical treatment for the past seven years. Without belittling the immense advantages of the surgical measures, he points out "that the brilliant results claimed by so many writers are not, as a rule, to be expected, and that disastrous results may follow their use in some, if not all classes of cases." He contends that the claim of many writers to cure the great majority of cases in from four to six weeks is based upon too brief observation; if these patients are kept track of, relapsing will be found to be the rule. "In many cases, I have gained the impression that corneal complications are more apt to occur in the relapses following so-called cures with surgical means, than when medical applications alone have been employed. When the diseased tissue is so localized that it can be easily excised, squeezed, or scraped out, a cure can sometimes be effected with one operation; but, generally, after all the surgical treatment that is advisable, in the course of a month or six weeks, I find it desirable to have patients continue applications of sulphate of copper for many months, returning

occasionally for such further surgical interference as may be required."

"With regard to the dangers of surgical treatment, the bad results which I have observed or known to follow it are, first, suppression of tear secretion, with resulting xerophthalmia; second, ulceration of the cornea, with partial or complete loss of sight." The writer speaks of several cases of the first sort in which the patients experienced no serious inconvenience from the reduction of tear-secretion; in one old case, however, the eye became xerophthalmic. Regarding corneal ulceration, he has seen slight erosions develop immediately after surgical treatment, but he attributed the majority of these to the free use of cocain.

"Really dangerous corneal trouble from surgical trachoma treatment, I have observed only from the aggravation of pre-existing corneal affections by the operation. Most writers speak of the rapidity with which corneal complications heal after the lids have been treated surgically, and in the great majority of cases this has been my experience also. Trachomatous pannus, in particular, clears up with rapidity after proper surgical measures. On the other hand, I believe that non-vascular ulcerations, whether superficial or deep, should be considered positive contraindications to any extensive surgical interference with the lids. Not that they will not, as a rule, be helped by such interference; for they generally heal promptly; but in rare cases, without our being able to foresee the dangers, they become so rapidly worse after operations for trachoma that the sight is severely injured, or entirely destroyed, before they can be checked. I have had two experiences of this kind and know of three others.

Continuing, the writer describes these unfortunate cases and concludes his paper as follows: "These cases make it plain, I think, that surgical measures have not simplified the treatment of trachoma; on the contrary, they have made it altogether more imperative that he who uses them should be able to examine the eye with the greatest care and discrimination; and should be prepared, if unusual emergencies arise, to treat them promptly and vigorously. Without these qualifications, the physician had far better stick to the old bluestone and nitrate of silver treatment; for with these remedies the disease can always be improved or held in check, and in many cases cured; whereas, if he uses surgical measures at all freely, while he may, as a rule, obtain more brilliant results, he is liable, at any time, to ruin an eye which otherwise would not be lost."

THE TREATMENT OF TRACHOMA OR GRANULAR CONJUNCTIVITIS.

Kenneth Scott, M. B., C. M., F. R. C. S., Edin., Cairo, Egypt, (*British Medical Journal*, Sept. 15, 1894). Mr. Scott's experience with a great number of cases of trachoma leads him to recommend in highest terms the use of a four per cent solution of cyanid of mercury. Formerly he had used the four per cent solution of bichlorid of mercury; he was led to change to the cyanid only on account of the discomfort and pain attendant upon the application of the bichlorid solution. The cyanid he found in no way detrimental to the cornea even though ulceration existed, less painful than the bichlorid and equally efficacious; if anything, the cyanid effected a cure in less time than the bichlorid. He advises the daily thorough application with a brush to the everted lids of an aqueous four per cent solution, and the instillation two or three times daily of a 1/4 per cent solution of the same salt "whatever the condition of the cornea may be, it never need be considered in regard to the application of the cyanid solutions, as I have never seen any caustic or permanent irritative effects produced by it. The bichlorid of mercury solution, however, must always be employed with care in this respect."

"I have tried the operative procedures which are often advocated, such as squeezing, etc., in conjunction with both the bichlorid and the cyanid forms of treatment; and have compared it when performed in one eye, with the simple treatment followed in the other eye, but have never found any increased benefit accruing which would induce me to adopt it invariably."

He reports his cases as cured after an average duration of from three to six weeks. He has had great success in the treatment of acute and chronic purulent and catarrhal conjunctivitis with solutions of this salt and also "that form of granular conjunctivitis which is seen in long-continued or neglected chronic catarrhal or purulent conjunctivitis, but which is quite distinct from proper granular conjunctivitis or trachoma."

THE TREATMENT OF EPILEPSY BY TENOTOMY OF THE EYE MUSCLES AND BY OTHER SURGICAL MEANS.

Casey A. Wood, C. M., M. D., (*New York Medical Journal*, July 7 and 14, 1894). Dr. Wood's very able article discusses the eye treatment of epilepsy and enters into an examination "of such other procedures as are likely to explain the *modus curandi* of ocular muscle-cutting in a certain class of epileptics." He men-

tions a number of cases of his own, dissects Dr. Ramey's recent report of twenty-five cases and then gives numerous instructive and entertaining extracts from literature bearing upon the subject of the value of various surgical procedures which have been in vogue at various times for the cure or relief of epilepsy.

He concludes his paper as follows:

1. Heterophoria in some form, latent or manifest, can be shown to exist as an ocular condition in fully ninety-five per cent of all individuals.

2. Alone and when associated with ametropia it is not an uncommon cause of so-called asthenopia.

3. In the latter case, the correction of the accompanying refractive error in the large majority of cases relieves all the symptoms set up, both by the ametropia and muscular anomally; when it does not, the heterophoria may be said to be responsible for the asthenopia.

4. It is highly probable that when epilepsy is in part or wholly the result of eye-strain, other evidence of the latter is present.

5. It must follow from the foregoing that in the eye-treatment of epilepsy of any decided degree, the correction of the ametropia, and not the correction of the heterophoria, is the first and most urgent duty of the ophthalmologist, and in cases where both are corrected at the same time, it is fair to suppose that the results, if any, are due to the ametropic correction.

6. In cases of epilepsy with heterophoria and ametropia, or where the correction of refractive errors has failed to relieve the asthenopic symptoms and the production of orthophoria is followed by cure of the epilepsy and the asthenopia, it is just to say that the operation on the eye muscles or treatment of them has produced the effect of stopping the convulsions.

7. In the absence of the ocular symptoms, apart from the epilepsy, an operation upon the eye-muscles stands in the same therapeutic relation to a cure or relief of the disease as do other surgical procedures that have, during the past century, been in vogue, such as tracheotomy, setons, ligature of the vertebral arteries, trephining, oöphorectomy, circumcision, castration, the actual cautery, the resection of stray scars, and so on.

8. These operations bring about a cure or relief of the epilepsy (both idiopathic and hystero-epilepsy), by their powerful mental effect upon the patient, a truth long recognized by neurologists.

9. Genuine cures of epilepsy by eye-treatment of any kind must necessarily be confined to those cases where a faulty ocular

apparatus acts as a peripheral irritant. It remains yet to be shown what anomalies of the extrinsic muscular portion of that apparatus are to any large extent responsible for the seizures of epilepsy.

10. The eye-treatment of epileptics who present signs of ocular distress has not received that attention which the importance of eye-strain in the category of reflex irritants seems to call for. The eyes should be carefully examined in every case of epilepsy where asthenopic symptoms are present or are suspected.

11. I question the wisdom of encouraging the profession and through them the laity to believe that *every* case of idiopathic epilepsy is a suitable one for eye-treatment, but prefer to say that only those cases are fit subjects, in the proper scientific sense, for eye-treatment whose visual organs are palpably the source of irritation giving rise to symptoms generally included under the term eye-strain.

12. That when all remedies fail, some such operation as Reynolds suggests, easy to perform, perfectly safe, and yet of a severity and character tending to make a lasting impression on the patient's mind is indicated. I would suggest the removal, at intervals, of small pieces of skin from various parts of the body, the denuded spots being allowed to heal by granulation.

THE IMPORTANCE OF MAINTAINING EQUAL ROTATIONS OF THE EYES AFTER OPERATIONS ON THE OCULAR MUSCLES.

George T. Stevens, M. D., New York, (*British Med. Journal*, Sept. 15, 1894). Dr. Stevens calls attention to the misleading character of the term "the squinting eye" in cases which are not strictly of a pathological character. He dwells upon certain conspicuous facts in relation to concomitant squint and discusses the causes of strabismus. All this serves as introduction to his criticism of the universal habit of correcting squint by division of an internal rectus of the squinting eye; this may remove the deformity of strabismus from the cosmetic point of view, but often fails to establish binocular vision which should be the supreme motive for the operation.

"Continuous binocular vision can only exist where there is approximate quality of tension of corresponding muscles of the two eyes, and easy binocular vision is only possible when the nervous impulse for the direction for one eye is exactly similar to that for the other. Corresponding action of two interni cannot be maintained, and in some cases cannot be even temporarily induced, in

a case in which the rotating power of one internus has been reduced, while the other remains intact and excessive.

"Here lies the secret of Von Graefe's cases of 'antipathy to single vision,' cases which are infinitely more common than is generally supposed and cases which, according to my own observation, occur only after operations. When one internus has been cut and another retains its excessive tension, and especially when the image of one eye lies normally in a higher plane than the other, there can be no permanent union of images. Few cases operated upon by the usual methods have any practical binocular vision. By careful attention, not to the gross and most conspicuous phenomena of strabismus, the lateral deviation, but to the essential and important relations of the tensions in vertical as well as in horizontal direction, the failure to obtain practical binocular vision, which is the extremely common result of strabismus operations, may be practically eliminated. An operation properly performed on a superior rectus will often completely relieve a moderate converging or diverging strabismus by removing the necessity for the squint.

"Even if the rotation is to be affected only to the extent of a few degrees, the equilibrium should be maintained. But if the correction of slight strabismus, or even of esophoria or exophoria by relaxation of a single muscle is to be avoided, how much more must we reject the idea of doing a tenotomy on an internal rectus and an advancement of the external rectus of the same eye, while the so-called but miscalled non-squinting eye remains with its original tensions. The precept which I would earnestly impress is one which I have already on former occasions urged, namely, that 'every modification of a lateral muscle by relaxation or by shortening which can in any degree affect the rotation of one eye should in every instance be accompanied by an exactly equivalent modification of the corresponding muscle of the other eye.'"

NOTE ON THE EFFECT OF PROLONGED EXCESSIVE LIGHT ON VISION.

George Lindsay Johnson, M. D., F. R. C. S., (*The Medical Press and Circular*, Sept. 5, 1894). "Having systematically examined the vision of the workmen engaged in Salviati's glass factory, he found a constant relationship between the duration of time that the men were exposed to the bright light of the furnace and the impairment of vision. This defect of vision takes the form of a gradual atrophy of the optic nerve with impaired vision, and a shrinking of the visual field for white, but most for red and

green. In no case did he get a clear history of the atrophy having become complete, but the vision sank to $^{20}/_{50}$ and $^{20}/_{70}$ in those who had been engaged at the furnaces for many years. The red, orange, violet and ultra-violet rays seem to be the injurious parts of the spectrum, the former showing its effects most on the retina and optic nerve, the latter on the conjunctiva and external parts. In no case where the workmen were exposed for several years to the furnace light did their eyes escape without some permanent loss of vision, but those men whose duties were not confined to the furnace, although in the same room and exposed to an equal degree of heat with the rest, escaped more or less completely. The effect of the furnace glare is quite different to that produced by snow, or from that caused by gazing at the sun. The first mentioned being a chronic atrophy, the second being an acute form of blindness, in all probability produced by exhaustion of the visual purple, while the latter is a destructive change caused by direct coagulation and disintegration of the bacilliary layers of cells. The remedy for furnace atrophy appears to be best met by covering the upper three-fourths of the side openings in the furnace with sheets of annealed spectrum blue glass, leaving room beneath for ventilation, and for the workmen to introduce and manipulate the glass. The constant use of spectrum blue spectacles or goggles serve even better, but there are practical objections to their use.

ON THE RELATION OF SOME OCCUPATIONS TO EYESIGHT.

Simeon Snell, F. R. C. S. E. (*The Med. Press and Circular*, August 22, 1894). In speaking of the various occupations in which men are exposed to intense light and excessive heat, Mr. Snell points out the fact that men employed in the large works in which iron is made and converted into steel are exposed to a heat of from 2,000° to 3,000° F. (the temperature of an ordinary grate fire is 500° F.). Such workmen protected their eyes with colored glasses. "Some men were unable to continue exposed to these heats and intense light, but others continued working with them without injury year after year, and, I think that, with protection, they can do so without injury."

Concerning the intensity of the light from some of the processes of the electric light, he states that the effect upon the eye is often injurious, and is becoming recognized. In electric welding the light is estimated at 8,000 candles and the heat 3,000° C. (about 7,000° F.). "Exposure to this light, however brief, brings on the

most excruciating eye pain with great swelling and lachrymation. It is felt immediately, but more violently some hours afterwards." These workmen use helmets with a glass door formed of six layers of glass alternately red and blue, and this protection answers well. The injury to vision in the cases is done by chemical rays and not by the heat rays, and it is thought that ruby glass gives better protection than the combination mentioned.

REPORT ON THE VALUE OF OBJECTIVE TESTS FOR THE DETERMINATION OF AMETROPIA—OPHTHALMOSCOPY, OPHTHALMOMETRY, SKIASCOPY.

By the Special Committee of the Section on Ophthalmology of the American Medical Association. (*Journal of the A. M. A.*, September 1, 1894.) The members of this committee were Edward Jackson, M. D., Chairman, Philadelphia; S. M. Burnett, M. D., Washington; H. V. Würdemann, M. D., Milwaukee, and J. A. Thomson, M. D., Kansas City. The committee reported that its members were all "in accord with the view held by most ophthalmologists that objective methods of determining ametropia cannot entirely replace the subjective method with test letters and trial glasses; and that, in so far as the subjective method is applicable, it may be regarded as a court of last resort. Determinations of the refraction by the various objective methods, however, constitute an essential portion of the complete examination of an eye. The accurate determination of ametropia is best accomplished by the use of all these objective methods in each case, and usually in the following order: The ophthalmoscopic examination, measurement of the cornea with the ophthalmometer, skiascopy—these to be followed by the subjective determination, and, if this last does not agree with the previous measurements, its findings should be submitted to re-trial by skiascopy." Regarding skiascopy, the report says in part: "Skiascopy is on the whole the most accurate and reliable objective method of estimating ametropia * * * * it offers for most eyes, a method for the easy and rapid measurement of ametropia, within the limits of practical accuracy for even the subjective method, except in eyes having more than the Snellen normal standard of visual acuteness. For the exceptional eyes, in which it is less accurate, it offers a means which, carefully used, will give confirmation of subjective results, or a better correction than may be obtained by any other method. In nearly all eyes the result of a careful skiascopic correction will give the best or very nearly the best obtainable vision."

SCOPOLAMIN: ITS VALUE IN OPHTHALMIC PRACTICE.

W. Harvey Smith, A. M., M. D., C. M., House Surgeon to the Manhattan Eye and Ear Hospital, New York. (*New York Medical Journal*, July 21, 1894.) After reading Dr. Smith's paper, one is forced to the conclusion that scopolamin excels as a mydriatic, but that it produces much more pronounced toxic symptoms than atropin does when employed in a similar manner; and these toxic symptoms seem to occur in a larger proportion of cases.

"Had it been possible to compare the action of other mydriatics on patients upon whom the scopolamin had been tried, the deductions might have been more absolutely reliable; still, I think the observations so far made justify us in coming to the following conclusions:

"1. That the toxic effect of scopolamin used in one-tenth and one-fifth per cent solutions are easily produced, but can be readily avoided if the lids be everted or the nasal ducts compressed at the time of the instillation.

"2. That in diseased conditions of the eye scopolamin is quite as useful a drug as atropin.

"3. That in refraction work, complete and thorough paralysis of accommodation with the maximum of mydriasis can be produced in from twenty minutes to half an hour, where the drug is used *coup sur coup*, and that the duration of its effects is from five to eight days.

"4. That its greatest value lies in the rapidity of its action, which renders it specially useful for purposes of examination in refraction cases and in diseased conditions of the interior of the eye."

OPTIC NEURITIS IN ITS RELATION TO CEREBRAL TUMOR AND TREPHINING.

Dr. James Taylor, (*The Lancet*, June 23, 1894). Report of meeting of Ophthalmological Society. In this paper, Dr. Taylor alludes to the fact pointed out by Mr. Horsley some time ago—the subsidence of optic neuritis after operation for removal of cerebral tumor, even when the tumor was not removed. He relates nine cases of optic neuritis associated with intracranial tumor, dividing them into three classes, three cases belonging to each class: In the first group of cases, the tumor was removed and the neuritis subsided. In the second group of cases, trephining demonstrated the existence of tumor, but the tumor was not removed; the optic

neuritis, however, subsided. In the third group of cases the optic neuritis disappeared after emptying the cysts and did not recur subsequently when the cysts refilled and there were additions to the tumors.

In conclusion, he states "that, even taking into account the fact that a large cerebral tumor might be present without producing optic neuritis, and that optic neuritis might be present without cerebral tumor, such facts and observations as were related in this paper made it evident, that in certain cases at least, of intracranial tumor, the pressure inside the skull was the effective agent in producing what was known as optic neuritis."

REMARKS ON THE PATHOLOGY OF DESCEMETITIS.

Herman Snellen, M. D., Utrecht, (*British Medical Journal*, Sept. 15, 1894). Dr. Herman Snellen remarked that descemetitis or serous iritis was a well-known disease of the eye, but that opinions differed as to its nature. Early observers believed it to be a disease *sui generis*, and applied to it the terms aquo-capsulitis, keratitis punctata, or descemetitis. Later writers looked upon it as a symptom of disease of the deeper parts of the eye, and as the iris was, as a rule, more or less inflamed, applied the term iritis serosa. Treacher Collins regarded the disease as primarily a catarrhal inflammation of the glands of the ciliary body, and Priestly Smith had in consequence suggested the term serous cyclitis in place of serous iritis. Recently, in the case of a lady, 28 years of age, in whom it was found necessary to perform sclerotomy, one of the dots came away with the aqueous humor, and was found on microscopical examination to consist of a conglomeration of microbes. These microbes were cultivated; they grew slowly. When stained with carbo-fuchsin and examined closely, they were seen to be very short bacilli. In the second case a dot was obtained and found to consist of cells with the same microbe between them. In this case the dot was probably older, the cells had been contracted and the microbes were dying off. Under the internal administration of salicylate of sodium the eye became quiet. Dr. Snellen concluded that descemetitis was really a disease *sui generis*, and should be known by that name, and not as serous iritis or cyclitis. Further, he held, that it was due to microbes growing in the anterior chamber, which, by the toxins they produced, caused irritation of the uveal tract. The dots, which were situated at first on the cornea might form subsequently

on the iris, lens, and ciliary body. They consisted of microbes at first, with which leucocytes became intermixed subsequently. Whether some cases depended upon deposit after inflammation of the deep parts remains to be proved.

OTOLOGY.

ABSTRACTS FROM ENGLISH AND AMERICAN CURRENT OTOLOGICAL LITERATURE.

By Leonard A. Dessar, M. D.,
of New York.

INCIPIENT INFLAMMATION OF THE EAR IN EARLY LIFE.

Dr. S. M. Smith (*New York Medical Journal*, July 21, 1894), calls attention to the necessity of the general practitioner acquainting himself thoroughly with the management of primary aural diseases, as the great majority of ear diseases (except traumatism) have their incipiency in infancy and early childhood. Among the large number of excellent suggestions presented, the following are cited here:

1. It is well to examine the external auditory canal of the new born child, and if it be free from accumulated material, and the membrana tympani is found to be congested, the tympanic cavity should be inflated by Politzer's method. If, however, this fails to relieve the symptoms, the drumhead should be carefully punctured and inflation again used, when relief will be almost immediate.

2. It is the imperative duty of every practitioner to be able to promptly recognize and immediately care for an acute suppurative inflammation of the tympanic cavity.

3. Deaf-mutism is not a distinct disease in itself, but must be accepted as a symptom, or better still, as a sequela of an existing disease.

4. Out of 51 deaf mutes that consulted the author in the past few months, 37 acquired their affliction, while the remaining 14 were congenital. Of the acquired ones 21 resulted from scarlet

fever, 9 from diphtheria, 5 from measles, and 4 from traumatism; 9 were between the ages 1 and 2 years, 16 between 2 and 3, and 12 between 3 and 5. He thinks that it is safe to assert that most of these acquired cases would have been prevented if the pus in the tympanum had been promptly evacuated at the proper moment, followed by mild antiseptic irrigation of the external auditory canal, inflation of the tympanic cavity, blood-letting, and the proper care of the throat.

NEW METHODS FOR RELIEF OF IMPAIRED HEARING.

In an interesting paper Dr. Louis J. Lauterbach, of Philadelphia (*College and Clinical Record*, July, 1894), describes a number of comparatively new methods of treating the ear, comprising the use of the phonograph, the vibrometer, vibrophone and metronomic ear masseur. On the ground of his observations, which have been quite favorable, he presents the following conclusions:

1. Poor hearing, when unconnected with closure of the meatus or disease of the nerve, is usually the result of some want of mobility in the sound conducting apparatus;

2. This want of mobility can almost always be overcome by the use of massage, especially pneumo-massage applied directly to the membrana tympani or ossicles;

3. That the pneumo-massage in ordinary cases is the most serviceable, phono-massage being especially indicated where there is a necessity of exciting the atony of the auditory nerves caused by disease; as

4. That the mobility of these parts increases, the hearing is restored and the tinnitus disappears;

5. That the results are most favorable in cases of hypertrophic catarrh, and in cases with retracted or perforated membranes following suppuration; less favorable in the proliferous variety of catarrh and unfavorable in the atrophic variety, and in cases of involvement of the auditory nerve endings.

6. That the treatment will in great part supplant the removal of the ossicles and similar operations, which operations should never be entered on for the restoration of hearing or the removal of tinnitus, until massage methods have been given a thorough trial.

AEOTHERAPEUTIC TREATMENT OF EAR DISEASES.

Dr. J. J. Hovent, of Brussels (*Food*, August, 1894), details the results of his experience with the compressed air bath, in diseases of the ear. During the period from January, 1892, to

February 1894, he has treated ninety-four cases, with complete cures in thirty-six and considerable improvement in twenty-two. The author's conclusions are as follows:

1. The compressed air bath is very useful in cases of nervous deafness;

2. The compressed air bath is antidyscrasic and antidiathetic. By its super-oxygenation it is applicable in cases of deafness with abnormal composition of blood;

3. The compressed air bath is antiphlogistic, antiseptic, and may be rendered aseptic. These properties are quite obvious in catarrhal deafness, with or without otorrhea, in the obstruction and stricture of the Eustachian tubes.

4. The compressed air bath is the best means to be employed for the massage of the tympanic membrane. It acts powerfully and innocuously on the two surfaces of that membrane. It is indicated in exudative inflammation, in polypus growths, in hypertrophic or atrophic catarrh of the middle ear, in ankylosis of chain, etc.

INTRA-NASAL GROWTHS AS FACTORS IN AURAL AND LARYNGEAL CATARRH.

Dr. Sargent F. Snow (*Med. Record*, August 18, 1894) states that he has found no case of post-nasal, middle ear, or laryngeal catarrh which was not accompanied by marked evidences, past or present, of pressure or contact of some of the surfaces in this region.

Many of these cases have shown a perfectly normal condition of nose in lower third, both inferior turbinated bodies apparently healthy, and patients claimed that they had no trouble in breathing, each nostril being perfectly free; their complaint, as they say, "is further back, or down," sometimes in the ear, sometimes in the larynx, and oftener their only symptom is of "something dropping into the throat."

A close examination of the upper portions of the nose will show, almost invariably, some point or points of contact between the middle turbinated and the septum or the outer wall of the nose, which, though slight in many instances, is, in the author's opinion, the cause of a great, and perhaps the whole part of the trouble, particularly if the contact be persistent.

DISEASES OF THE EAR AS A COMPLICATION IN EPIDEMIC INFLUENZA.

Dr. Lawrence Turnbull, of Philadelphia (*Medical and Sur-*

gical Reporter, July 28, 1894), formulates the results of his observations of ear diseases following, in the following conclusions:

1. There is a peculiar inflammation of the ear termed influenzal otitis;

2. It almost always commences with hemorrhagic, dark blue or black bullæ seen in the lower posterior segment of the membrana tympani;

3. After a time a perforation of the membrana tympani takes place, with a discharge of bloody muco-serous fluid;

4. The pain, which is severe before the perforation, is not entirely relieved by it, and continues assuming more of a neuralgic character. There are subjective noises (tinnitus aurium) such as pounding, hammering, and roaring, and if not properly treated by inflation or Politzer's douche or the catheter, remain after all the inflammation has ceased;

5. Fatal results may follow from meningitis, abcess of the brain, and more frequently sinus phlebitis. Such cases we are called on to diagnose, being sent to our clinic as abscess of the brain.

NOTES ON DISEASES OF THE UPPER AIR PASSAGES IN APEX CATARRH.

Dr. Howard S. Straight, of Cleveland (*Med. Record*, Septemtember 22, 1894), has observed a condition simply called "lowered vitality, general depression, etc.," but which he designates "Apex Catarrh" in a large proportion of the cases of nose, throat and ear disease occurring in his practice. This condition is especially prevalent in patients from 8 to 40 years of age. Patients who have an apex catarrh are very susceptible to colds which may involve any part of the upper air passages, or the middle ear, or the entire mucous membrane, and do not yield readily to treatment. Nearly one-half of all the cases of ear disease in patients from 8 to 40, that pass under the author's observation, have apex catarrh.

While the increased susceptibility to colds accounts for the acute inflammations of the middle ear that are so often seen in patients with apex catarrh, he has been repeatedly surprised at the number of cases of chronic middle ear inflammation that present themselves on account of their increased suffering under a similar constitutional condition. These patients are often people who have suffered for years from marked loss of hearing, and who have ceased to believe that there was any hope of relief. Upon the development of an apex catarrh, they begin to suffer more

from catarrh of the upper air passages, and to complain more from the subjective symptoms. The examination of the ear often reveals simply marked changes from an old inflammation, and yet no trace of any acute trouble.

Such cases under creosote, without any local treatment, very soon regain their usual amount of hearing. The author strongly urges the importance of treating the apex catarrh by the use of tonics, iron, etc., in connection with the local treatment.

NOTES FROM FOREIGN OTOLOGICAL JOURNALS.

By T. Melville Hardie., B. A., M. D.,
of Chicago.

HISTORICAL ACCOUNT AND TECHNIQUE OF OPERATIONS FOR THE THOROUGH OPENING OF THE MASTOID AND MIDDLE EAR.

Zaufal, (*Archiv. f. Ohrenheilk XXXVII.*, 1 and 2, Aug., 1894), presents one of the most important contributions to otology of the year. To Von Tröltsch and Schwartze are accorded the position of pioneers in the radical operations upon the middle ear and adjacent mastoid. As the Schwartze operation has been proved to be inadequate to the cure of many of the chronic cases the tendency in otological surgery has been in the obvious direction of complete operation. Küster's dictum that a rational surgical procedure must "von dem Grundsatze ausgehen" the bone must be extensively opened and everything diseased seen and removed is now generally accepted; and Zaufal considers this best attained by his operation, to be presently described. Zaufal's side as to priority over Hartmann in the description of the operation is given at length in the paper and the comparative merits of his own and Stacke's operation presented with fine clearness and impartiality.

Zaufal discusses his operation under the following heads:

1. The laying bare of the field of operation.

2. The removal of the superior membranous lining of the pars osseae of the external meatus.

3. The opening of the antrum by chiselling of the mastoid process and the complete removal of the posterior bony wall of the external meatus.

4. The removal of the pars epitympanica.

5. Curetting, etc., of the operation cavity.

6. Sutures and bandaging.

7. After treatment.

1. Laying bare of the field of operation. An incision beginning 2-3 cm. below the tip of the mastoid process is carried perpendicularly upwards, through skin and periosteum, over the middle of the process to about 2 cm. above the linea temporalis. From the upper extremity of this forward 3-4 cm. the posterior border of the temporalis muscle being, as a rule, cut through. Very great infiltration makes the extension of the horizontal incision backward for 1-2 cm. occasionally necessary. If the sigmoid sinus is to be exposed, the horizontal incision must extend 3-4 cm. backward. After tying the arteries the flaps are to be carefully raised with a Hagenbeck raspatory, first anteriorly. The insertion of the head of the sterno-cleido-mastoid must be cut through with a scalpel, until it is possible to insert the finger on the inner side of the tip of the mastoid. Then the periosteum is to be raised backward as far as the posterior border of the process.

2. For removing the upper and posterior portion of the membranous lining of the bony meatus Zaufal gives the following directions: First insert a drainage tube corresponding in size with the lumen of the meatus and cut through the posterior half of the membranous lining at the margin of the bony meatus with a sharp-pointed bistoury, and withdraw the tube. Next, the short, narrow, sharp-pointed bistoury is introduced as far as the margin of the drumhead and the membrane cut through in a direction corresponding to the upper margin of the anterior wall of the pars tympanica; a second parallel incision is made in the same way below and posteriorly. The flap so cut through is carefully raised from the bone and readily withdrawn by means of forceps. Zaufal, in comparing his treatment of the membranous lining with Stacke's, admits that theoretically Stacke's is the more nearly correct, but contends that practically his own method is the better, because it is impossible to separate and withdraw intact the membranous lining, and the portion left behind in the innermost part of the canal is for the most part destroyed in chiselling the pars epitympanica and the outer wall of the antrum, and further, that a portion of the thinner lining on the anterior wall is nearly always torn by the

raspatory and dies. He contends further that there is much less danger of stenosis and adhesions when the lining is left on the anterior, the inferior, and postero-inferior walls of the meatus than exists when the bony canal is completely laid bare and necessarily covered later with granulations. He advises the insertion of a thin drainage tube in the external meatus during the chiselling away of the upper posterior wall so that the anterior wall may escape injury.

3. Zaufal prefers the gouge to the flat chisel as being better suited to the curved contour of the bone. It varies in width between 1 cm., 6 mm., and 5 cm. The length with handle is 21 cm. For the removal of bony projections he uses the bone forceps of Luer in two sizes. Fissures in the bone are not to be feared. Zaufal has never observed any. The cutting edge of the forceps must always be held perpendicularly to the surface of the bone and the piece of bone engaged must be bitten off without any to and fro movement of the forceps. The operation varies according as the mastoid process is made up of pneumatic or compact bone. Fistulæ are, of course, more frequent in the first group. In the pneumatic bone whether a fistula exists or not, one begins with the widest gouge 1 cm. behind the posterior margin of the bony meatus and directly below the linea temporalis and removes thin flakes forwards and inwards. The second and third applications of the chisel begin a little posterior to the first. As soon as a cavity containing pus, granulations or cholesteatoma is opened sufficiently the bone forceps is used. If a fistula exists it is to be enlarged, first with the chisel and then with the bone forceps. When one comes upon a gray shining membrane care is necessary as it may be cholesteatoma, the pyogenic membrane of an abscess or the wall of the sinus. Two dressing forceps are used in the investigation. In the solid mastoids the chiselling is begun in the same way and situation, and the broad thin flakes are removed level with the inferior border of the opening of the bony meatus. If even yet no cavity is opened a smaller gouge is used and the upper half of the cavity is opened forwards and inwards as posteriorly we should expect to find the sinus. If the linea temporalis projects in such a way as to greatly limit our view of the field it is to be rounded with the gouge from above downwards. The upper part of the bony meatus should be removed at the same time. As one proceeds, a sound with its point bent at a right angle should be introduced through the external meatus into the antrum so that the thickness of the bridge of bone still remaining may be estimated

and the exact location of the antrum determined. After the antrum has been reached a thin straight bone forceps may be used to enlarge the opening posteriorly.

4. The removal of the pars epitympanica. If the ambos is in sight anteriorly it is to be removed, but if hammer and ambos are imbedded in granulations as is usually the case, Zaufal loosens the mass and pushes it forward into the middle ear until the removal of the pars epitympanica has been effected with forceps or chisel. If the forceps be used, one blade is introduced from the antrum cavity and the other from the external meatus and the bone gradually pinched off. When using a small chisel it must be placed on the upper anterior end of the posterior free border of this bony plate and struck carefully in a downward, forward and outward direction, then the postero-inferior part in the same way. Or one may chisel from the external meatus if he first protects the inner wall of aditus and middle ear with a bent sound or Stacke "schetzhebel," and finally with the favorite straight Luer bone forceps.

5. When curetting and cleansing the cavity it is better to begin at the edges and proceed gradually further in. The sharp spoon is as a rule the best instrument. When cholesteatoma or caries exists the bone must be very thoroughly scraped. Small depressions are to be scraped with a small spoon. If the wall of the sinus is bare, that part of the cavity should be left until the middle ear has been cleansed, so that in the event of bleeding the bandage may be immediately applied. Zaufal uses the Pacquelin cautery in cholesteatoma, if there is a bony wall surrounding the cavity. With an exposed dura or sinus wall this is not done, and the facial nerve must never be forgotten. More recently, Zaufal has instead used tincture cantharidum, especially in the after-treatment.

The removal of ossicles is to precede the curettement of the antrum and middle ear and as they are usually covered with granulations, our anatomical knowledge must be brought into requisition. The tendon of the tensor tympani is first cut through and then the connections between ambos and stapes. The ambos is removed with forceps and then the hammer which offers much more resistance; occasionally the use of the sharp spoon is necessary. When curetting the cavity an assistant is entrusted with the task of observing the face for twitching of the muscles supplied by the facial nerve. Zaufal uses ordinarily a heart-shaped curette and a smaller round one.

Curette first the antrum, thence proceed by way of the roof of

the attic and middle ear to the upper wall of the Eustachian tube, then the floor, and the posterior, inferior and inner wall of the middle ear, where, on account of the facial nerve, care must be taken not to scrape with too much vigor. After irrigation with a 1:1000 sublimate solution and drying, search is again made with a probe for carious spots, the posterior wall of the antrum being removed if required. The cautery is used as indicated above, the cavity once more irrigated and the bleeding stopped.

6. Zaufal sutures the horizontal incision and the upper 3 to 4 cm. of the perpendicular. Then follows a second careful irrigation. The tamponing of the cavity is done first from the external meatus. A strip of iodoform gauze, about 4 cm. wide, is introduced by means of forceps to the bottom of the cavity. A similar strip in the external wound, and the remainder of the cavity filled with a large tampon of the same material. Great pressnre of the gauze in the middle ear is to be avoided on account of possible injury to the facial nerve. External to the iodoform gauze come successively sublimate gauze, absorbent cotton and a moist gauze bandage. The wound is to be dressed for the first time in five to six days, then in three days, later daily.

7. The after-treatment will be discussed here only with reference to the advisability of securing a permanent opening by skin grafting in the mastoid process. Schwartze, Stocke, Siebenmann and others endeavor to secure this opening; Zaufal does not. He contends that the attempt to cover this cavity with epidermis can be successful only when the cholesteatoma has been radically extirpated and that when it is destroyed the permanent opening is unnecessary. If cholesteatoma again develop in the middle ear after the mastoid opening has closed he would prefer to operate a second time. He considers further the scar a *locus minoris resistentiæ*, and that any inflammatory products which might develop would use this scar as an opening and in this way an extension of inflammation to the cranial cavity be prevented.

THE TENOTOMY OF THE TENSOR TYMPANI IN CHRONIC MIDDLE EAR INFLAMMATION.

Hoffmann reports the results in twenty-two cases operated upon in the Jena clinic. Subjective sensations disappeared in four cases after the operation. In one case, in a year after the operation. The hearing power was improved in 15 per cent, unchanged in 45 per cent, diminished in 40 per cent. For whispering speech, improvement in 50 per cent, unchanged in 35 per cent, diminished

in 15 per cent. The purulent discharge ceased in 40 per cent; in two cases there was no otorrhea at the time of the operation, and none developed since; in 40 per cent there has been a discharge. With regard to the hearing, improvement is to be expected only if there is no anchylosis of the stapes, no affection of the auditory nerve and no extensive adhesions in the middle ear; a cure of the purulent discharge only in such cases as are not complicated by caries. The author considers that we have in tenotomy a conservative method of treatment and that from the practice of this operation we have learned much relative to the clinical significance of perforations situated at the upper and lower extremities of the hammer respectively. In the former we may almost invariably expect caries, while the latter, on the contrary, are present in uncomplicated cases of purulent otitis media.

RHINOLOGY AND LARYNGOLOGY.

ABSTRACTS FROM CURRENT LARYNGOLOGICAL AND RHINOLOGICAL LITERATURE.

By M. D. Lederman, M. D.,
of New York.

FOLLICULAR TONSILLITIS, ETC.

Dr. N. Wolfenden (*Jour. of L., R. et O.*, Vol. 8, No. 8). After a most scientific discourse on the pathology of follicular tonsillitis, the author states that in the future a diagnosis will be made bacteriologically. He furthers the suggestion of Bulloche, who divides the subject into as many varieties as there are distinct micrococci found under the inflammatory conditions. The "pneumococcal" and "staphylococcal throats" are not as contagious as the "streptococcal" variety. The latter resembles infectious diphtheria, with the distinction that in infectious diphtheria the Löeffler bacillus is in combination with streptococci, and is usually fatal, while in the streptococcal form Löeffler's bacilli are absent, and the disease, even if serious, may get well.

Streptococcal throats are not contagious, in the ordinary usage of the term, and paralysis has never been seen to follow its presence. Placing patients with the streptococcal throats in a

diphtheria ward, subjects them to a true attack of diphtheria of a most virulent and fatal character. Membrane may be found in all the above types, with the usual manifestations of sore throat. Antiseptics is the treatment indicated.

REFLEXES ORIGINATING FROM THE NOSE, PHARYNX AND LARYNX.

Dr. R. Casadesus, Barcelona, (*Ibid*). Some of the many peculiar symptoms arising from intra-nasal, pharyngeal and laryngeal irritation are vividly demonstrated in the histories of the cases reported by the observer. In one case, a young girl of 16 was the subject of hysterical convulsions. These attacks were brought on by irritating the inferior turbinals; and were promptly relieved by applying a 10 per cent solution of cocain to the parts. Cauterization of the sensitive areas resulted in a cure.

In the second instance, a lady, 35 years of age, complained of headache, palpitation, dyspepsia, œdema, both fixed and erratic, insomnia, etc. Some nasal obstruction brought her to the author for advice. Applications of cocain relieved the headache and a suffocated feeling, but in attempting to leave the office the patient was attacked with symptoms of hystero-catalepsy. Wishing to ascertain whether these attacks were of nasal origin, the turbinals were irritated by means of the probe, and the cataleptic symptoms soon appeared. The sensitive zones were cauterized, which procedure brought about an amelioration of all symptoms.

The third observation was a 16-year old girl of a hysterical nature. She complained of a peculiar sensation in the throat. Touching the slightly hypertrophied inferior turbinated bodies brought on a strong convulsive attack. After a moment's intermission the attack reappeared. The following day an application of cocain stimulated another seizure, and these symptoms returned quite frequently during the succeeding day. The inferior turbinals were freely cauterized, and after several visits the symptoms did not return. The feeling in the throat persisted, however. On careful examination, a sensitive spot was discovered in the left tonsil, which, when irritated, produced a convulsive paroxysm. The author thought this to be a transposition of the hystero-genetic zone. This hyperasthetic region was treated in the usual manner, and the patient was completely cured. The latter operation was performed without an anesthetic, as the slightest contact of the brush provoked an attack, causing the patient to tightly close her jaws.

The author states that after careful observation, his experience corroborates the opinion of Lichtwitz: "(1) The existence of hystero-genetic zones in mucous membranes; and, (2) That the said zones represent a more important part than that of being simply sympathetic, because their destruction terminates the series of nervous functional perturbations deriving from them."

REPEATED PERFORATIONS OF THE CRICO-THYROID MEMBRANE FOR TREATMENT BY SPRAYS, ETC.

Dr. Rousal, (*Ibid*). No unpleasantness has followed this method of applying local therapeutic agents in the treatment of tubercular disease, both local and pulmonary. The observer punctures the membrane with an exploring needle (five centimeters long), and then injects with a syringe (capacity five cubic centimeters). In tubercular œdema of the glottic tissues, he advocates the injection of pilocarpin or strychnin. As "a topical modifier of diseased tissues," he recommends arsinat of strychnin, hypersulphit and phosphat of soda, or a solution of pure carbolic acid in almond oil. Only solutions of menthol, thymol, etc., are sprayed directly into the trachæ for pulmonary absorption. The operation does not disturb the patient very much, and leaves no trace afterwards.

TRACTION ON THE TONGUE IN HYSTERIA.

F. Balade, (*British Med. Journal*, No. 1758). In two cases this novel method has resulted in a cure after all other treatment had failed to relieve violent paroxysms. The tongue must be drawn out of the mouth with some force.

THE TRUE NATURE OF "FALSETTO."

E. D. Palmer, Mus. Bac. Hon. (*The Lancet*, No. 3706). In a letter to the editors, the author states emphatically that the "ordinary voice" is "produced throughout by precisely the same mechanism as that employed in the production of the so-called 'falsetto;'" and "falsetto" itself is the remains of the rightly produced voice after years of wrong production.

TREATMENT OF DIPHTHERIA BY INSUFFLATIONS AND TABLOIDS OF SULPHIT OF MAGNESIUM.

H. Brabant, M. R. C. J., (*Ibid*). This therapeutic agent has given good results in the manner indicated. Insufflations should be carried out every two hours, accompanied by the usual stimulants, together with iron and chlorat of potass.

TUBERCLE BACILLI IN THE NASAL CAVITIES OF HEALTHY MEN.

Dr. Strauss (*Maryland Med. Journal*, whole No. 700). Tampons of sterilized cotton wool were placed into the nasal cavities of twelve healthy subjects and afterwards shaken up in sterilized bouillon or water. This liquid was injected into the peritoneal cavity of twenty-nine guinea-pigs. In seven cases the animals died of septicemia or purulent peritonitis. In nine cases which died or were killed at the end of three or five weeks, the post-mortem revealed undeniable tuberculous lesions. These experimentations prove conclusively that tubercle bacilli may enter the system through the nose; may not infect the individual while inhabiting this region, and still be virulent enough to cause the disease when injected into animals. These demonstrations show how repeated epistaxis in a patient may lead to a tubercular affection.

NASO-PHARYNGEAL FIBROMA.

Dr. R. H. Woods (*The Dublin Journal of Med. Sciences.* No. 173). The patient was a young man, 24 years of age, who complained of complete nasal obstruction, associated with giddiness, failure of memory and great drowsiness. On examination the whole naso-pharynx and the greater part of the left nasal fossa were filled with a typical fibroma. His voice was without nasal tone. The growth was removed by means of a "galvanic curette" invented by the author. The instrument consisted of "a semi-circle of platinum wire brazed to the ends of two insulated copper rods." The tumor was cut away piecemeal; sometimes applying the curette through the nostril, and then posteriorly. Bleeding was not marked, nor did the patient experience much suffering. The voice returned to a normal tone.

LARYNGEAL LEPROSY.

Dr. Paul Bergengrün, Rega (*Archiv. für Laryng. und Rhinologie*, Vol. 2, No. 1). The nine observations were made from the larynges of the individuals who during life showed the true tubercle of leprosy. The microscopical examination showed in general a marked retraction of the epiglottis, with a knotty hypertrophy of its mucous membrane, both of the laryngeal and lingual surface, but especially noticeable on the latter surface. The ary-epiglottidean ligaments were usually thickened, twisted and shortened. The true and false chords presented the peculiar

warty appearance as that noticed on the epiglottis. This overgrowth seemed to affect the "processus vocalus" more markedly than any other portion of the chords. Below the glottis, the mucous membrane was hypertrophied in the same manner. In some cases there were signs of perichondritis.

IDIOPATHIC ACUTE PERICHONDRITIS OF THE NASAL SEPTUM.

Dr. A. Kuttner, Berlin, (*Ibid*). Three instances of this rare affection are reported. Obstructive symptoms, with pain, redness and fluctuation existed. Incision, curetting the abcess cavity and tampons of iodoform gauze was the treatment employed.

ANTIPYRIN A LOCAL ANESTHETIC IN DISEASES OF THE LARYNX AND PHARYNX.

Neuman, Pest, (*Internat. Centralblatt für Laryng. und Rhinol.*, Vol. 11, No. 2) states that the drug is of advantage as it does not cause unpleasant symptoms. In 30 to 50 per cent solutions it acts as a germicide. Combined with starch, he blows it into tubercular larynges with agreeable results.

NOCTURNAL ENURESIS DUE TO NASO-PHARYNGEAL DISEASE.

Dionisio, Turin, (*Ibid*). Adenoid growths were the irritating factors in this instance. After their removal, the 10-year old female patient improved. An attack of coryza brought on the old trouble a month later, but after the cold in the head was relieved the enuresis disappeared.

XEROSTOMIA (MOUTH DRYNESS) WITH DRYNESS OF THE NOSE AND EYES.

Dr. T. R. Frazer, Edinburgh. This peculiarity has never before been observed. The dryness of the eyes followed a nervous shock, while the mouth and nasal dryness followed the extraction of a tooth, and afterwards wearing a false set of teeth. Some improvement was noticed after the the patient held a weak solution of pilocarpin in the mouth.

SPONTANEOUS HEALING OF A LARYNGEAL POLYPUS AFTER TRACHEOTOMY.

L. Stembo, Wilna, (*Ibid*). After a necessary tracheotomy for some existing disease, a polypus situated beneath the left vocal chord, disappeared in three months without further attention.

ACCURATE AND CONVENIENT PRISM-SPECTACLES FOR INNERVATIONAL GYMNASTICS.

By George M. Gould, M. D.,
of Philadelphia.

IN the treatment of muscular imbalance by innervational gymnastic exercises I have found no method of using the prisms satisfactory. Hanging prism-fronts upon the spectacles worn, drags upon the frame and gets it out of adjustment, especially when high powers are used, and besides, by such a plan there is no accurate and close adjustment of the prisms themselves. Non-interchangeable prism-spectacles are expensive, heavy, and troublesome in many ways. Round interchangeable prisms have all these disadvantages and the fatal one of inaccurate adjustment, and

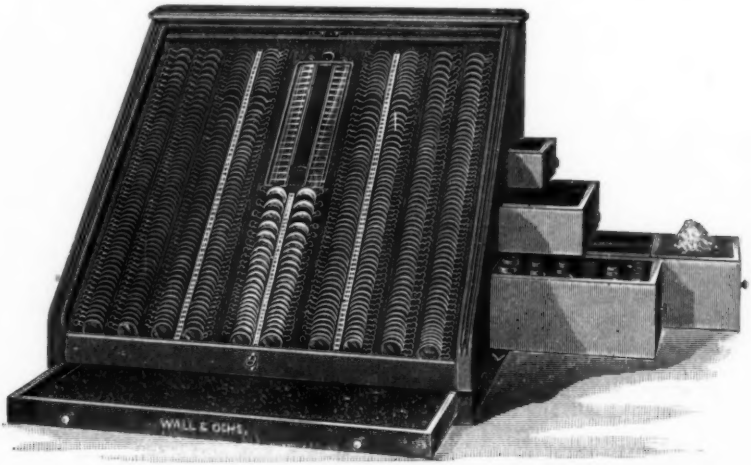
inaccurate placing of the base of the prism. The treatment by innervational gymnastics has value in proportion to the accuracy with which the prisms set before the eyes. Nothing for example could be more outrageous than the plan I have heard of being used of permitting the patient to hold the prisms in the hands while attempting the exercise. The innervation of the muscles must be precise and always the same. This may be perfectly effected by means of the little device here pictured. The frame is rigid, without movable parts and hence holds the prisms accurately horizontal. Having once been rightly adjusted to the peculiarities of a face it will not get out of shape. Prisms of all powers, and either with the bases in, out, up, or down, may be used with the same frame. The facility of changing the prisms at pleasure is very convenient. By grinding the interchangeable lenses in a rectangular form, as shown, accuracy of alignment is secured together with a lightness of weight scarcely if any exceeding that of an ordinary spectacles. In all ordinary degrees of exophoria, (the defect that constitutes nine-tenths of the muscular troubles we are called upon to treat), I find that the gymnastic exercises

quickly call for higher degree prisms until in a short time the exophoria has disappeared. It is of great advantage, therefore, to be able to supply such prisms successively and readily with no refitting of frame, etc., and at a minimum cost. Indeed, if the optician charges but a small sum for *lending* the outfit, the expense to the patient is inconsiderable.

A NEW STYLE OF A CASE OF TRIAL-LENSES.

By Geoege M. Gould, M. D.,
of Philadelphia, Pa.

IN devising the case of test-lenses, illustrations of which are herewith given, I had in mind as my chief object to minimize



The Case of Trial Lenses with the roller top pushed up, showing the lenses in position and the drawers partly drawn out.

the vexation and labor of the routine work required in using the old style of flat case, by placing the lenses in racks fixed on an incline at an angle of about 60 degrees, so that the numbering of each lens could be plainly seen and the lens itself picked out of its place with ease when required. If one uninterruptedly works at refraction four or five hours a day by the subjective method, every movement or motion saved, every bend of the body or scrutinizing glance spared becomes in the total an important consideration.

Sitting at the right of one's patient the arrangement of the lenses is such as to economize time, and mental and physical exertion. The most used lenses are the weak plus sphericals and the weak plus cylinders, and these are placed in the lowest part of the racks in front by the right hand. The higher power lenses are graded regularly and progressively higher toward the top of the case. The minus lenses are similarly placed at the left. The prisms occupy the lower central space; the miscellaneous lenses the upper lateral central space. I have had a space fitted to receive the "double battery" of prisms which I use, so that this instrument is always at hand. A shallow drawer below, extending the full width and length of the case, gives a temporary place in which to drop the lenses just used when he has not time to put them back in the proper slots. The drawers extending entirely through the case from side to side behind and below the lens-racks may be of the sizes and partitioned as desired to hold all the instruments, drugs, etc.—the entire armamentarium of the oculist. The weight of the flexible roller-top is neutralized by a spring roller so that closing or opening the case is quickly and easily effected. Besides the color of the cells, the handles of the minus lenses have a piece gouged out of each, so as to make the distinction more easy when a number are lying in the drawer below, or when one may have been misplaced in the rack.

There are twenty-three pairs of prisms, forty-eight pairs each of + cylinders and of — cylinders, and fifty-eight pairs each of + spherical and — spherical lenses. The handles on all lenses are made solid so as to permit of the use of large figures, also are soldered flush with the bottom edge of the cells. This permits two lenses being placed back to back; it also makes a much neater finish in burnishing the lenses in the cell. All the sphericals are plano-concave and plano-convex. In neutralizing them this will be found a decided improvement over the old form.

The numbered strips are all dead-black metal with white enamelled figures, making the replacing of lenses very easy. The case is made of solid mahogany throughout. It is constructed for purposes of time-saving and labor-saving, and is designed to last a life time. It is a beautiful piece of workmanship. Messrs. Wall & Ochs of Philadelphia, are the manufacturers.

PROFESSIONAL NEWS.

Dr. Edward Jackson, of Philadelphia, passed through St. Louis October 25th, on his way to Denver, where he expects to remain a few months for the purpose of giving his wife, whose failing health requires attention, an opportunity to be benefited by the climate.

Dr. Rolland C. Hodges has resigned the lectureship of ophthalmology and otology in the Medical Department of the University of Texas and removed from Galveston to Houston, Texas. Dr. Hodges bade his friends good-by at Detroit, Mich., and went to Texas fourteen years ago, to die, but through a mistake in prognosis he disappointed the coroner and regained his former robust health, and now takes care of an extensive practice, which will be much increased by his locating in Houston.

Dr. Edwin L. Sessions, of Hillsboro, Texas, has been so unfortunate as to lose his home, library, instruments, and all that a physician is expected or allowed to have, by fire, but he is not the kind of a man who gets discouraged or becomes despondent under the frown of the fickle goddess of (Miss) fortune. Dr. Sessions has by his good work in the practice of ophthalmology and otology laid the foundation of an imperishable fortune in the hearts of his grateful patients and his energy will enable him soon to accumulate many times the amount of his losses. It is easy to say "physicians should have their property insured like business men," but most of us neglect it like Dr. Sessions.

Dr. A. G. Aldrich will remove from Anoka, Minn., to Saint Joseph, Mo., on or about the 1st of December. The number of reading ophthalmologists in Missouri is so small that we take great pleasure in changing the address of Dr. Aldrich on our subscription list, and we are confident that he will have no cause to regret locating in "St. Joe." There is work in the State of Missouri for many more well trained, capable ophthalmologists.

It will be observed that the paper on "Toxic Amblyopias," by Dr. Casey A. Wood, is concluded in this issue of the ANNALS. Dr. Wood has devoted a large amount of time and labor to the

preparation of the paper. One has but to look over the list of references to be convinced that nothing on the subject has escaped. The value of the work, for reference, is obvious. As the subscribers to the ANNALS are aware, Dr. Wood has been working on the subject three years, and publishing as much as we could make room for in each issue of the ANNALS, so that the "400" who subscribed for the ANNALS the first year of its publication will have the work complete in their volumes of the ANNALS, but for the accommodation of physicians who did not subscribe for the ANNALS the first year, Dr. Wood has ordered a small number of reprints, which will be bound in book form with a complete index, which will be highly appreciated by the well informed physician. The book will be a handsome volume of considerable size.

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